



SATURDAY, OCTOBER 25, 1873.

## Watkeys' Throttle-Valve.

The accompanying cuts represent an arrangement of throttle-valve for locomotives and other engines which presents some new features. The object of the arrangement is to enable the throttle-valve to be opened gradually by relieving it of a portion of the steam pressure, and also to obviate the danger of starting the engine too suddenly by admitting only a small quantity of steam at first to the cylinder. This object is attained by placing within the main valve a small additional valve which will open always before the main valve. The arrangement of the levers by which the valves are opened is also claimed as novel. The larger cut is a section through the steam-dome and throttle-pipe of a locomotive, showing the throttle-pipe and valve and the arrangement of the levers. The smaller cut is an elevation, on a larger scale, of the main and supplemental valves.

The throttle-pipe is placed in the dome and secured to the dome and dry-pipe in the usual manner. At the top of the throttle-pipe is seated the main valve *E*, in the center of which is seated the supplemental valve *F*. The stem of this valve passes through a guide in the lower part of the main valve *E*, and, by means of the nuts in the lower end of this stem, the distance which the supplemental valve lifts before the main valve commences to open can be adjusted at will. To the top of the supplemental valve *F* is attached a bell-crank, *G*, which is pivoted on a bracket, *H*, cast on the throttle-pipe.

To the other end of the bell-crank, *G*, is attached a lever, *I*, which is pivoted at a point near its center to a bracket, *K*, also cast on the throttle-pipe. To the lower end of the lever, *I*, is attached a rod, *L*, which passes through a stuffing-box in the end of the boiler and is worked by a lever in the usual manner. The lever, *I*, and bell-crank, *G*, form together a toggle-joint, thus securing ample force to lift the valve, combined with considerable delicacy of movement. The stem of the supplemental valve lifts the main valve by means of the nuts and washer on its lower end.

It is claimed for this valve that the supplemental valve, being small, is easily opened against the pressure of steam, and that after it is opened the larger valve becomes partly balanced and is also easily opened. It is also claimed that it can be repaired readily and cheaply, and that it is a very durable valve.

The supplemental valve and the arrangement of the levers are patented by Mr. Henry Watkeys, Master Mechanic of the New York Central & Hudson River Railroad at Syracuse, N. Y.

## Modern Steel.

(Continued from page 436.)

Now, as regards the question of toughness and malleability, and referring again to Mr. Kirkaldy's experiments, it appears that in the tests of "Bessemer steel" eighteen samples were tried under tensile strain, the length of the samples being in round numbers 50in., and the diameter 1.382in.; and that when these were subjected to ultimate strain, the elongation at the moment of fracture was in the most brittle example 2½in., but generally varied from 4½in. to 9½in. In the experiments on transverse strain, in which the bars were nearly 2in. square and only 20in. between the points of support, all the "Bessemer steel" samples, except two, bent 6in. without any crack. Again, in the experiments made by the committee on bars 14ft. long and 1½in. in diameter, out of twenty bars of the milder quality of steel, sixteen extended more than 8in., and of these ten extended more than 12in.

As another example of the malleability of steel, I may mention that I have seen a piece of rail, weighing 80lb. per yard and 12ft. in length, held by one end and twisted at the other, until it made 6½ complete revolutions before it broke. The fracture occurred at one end, leaving about 11ft. of the rail in the twisted form which had been given to it. In this twisted state the rail was laid on two bearings 3ft. 6in. apart, and subjected to the blow of one ton weight falling 30ft., and it bore one of these blows without breaking. I have also used a considerable quantity of steel rails, the test to which they were subjected being one ton falling 20ft. on a 3ft. 6in. bearing, and out of the whole number tested there was not one which broke with this test. The effect of the blow was to produce a set of about 2½in.; and if the rail was then reversed and struck on the other side, it became nearly straight again. As a rule, the rails yielded to the third blow; but I have seen seven blows given without producing fracture. On the other hand, five of the bars tested by the committee were of inferior malleability. We have also instances in which steel rails break with the jar

produced in being thrown off the wagons on to the ballast; and there is no doubt of the fact that steel is made and sold which is cold-short, and not reliable for use for engineering purposes. This irregularity appears to arise mainly from the difference in the chemical constituents of the metals or ores employed, or in the process pursued by different makers.

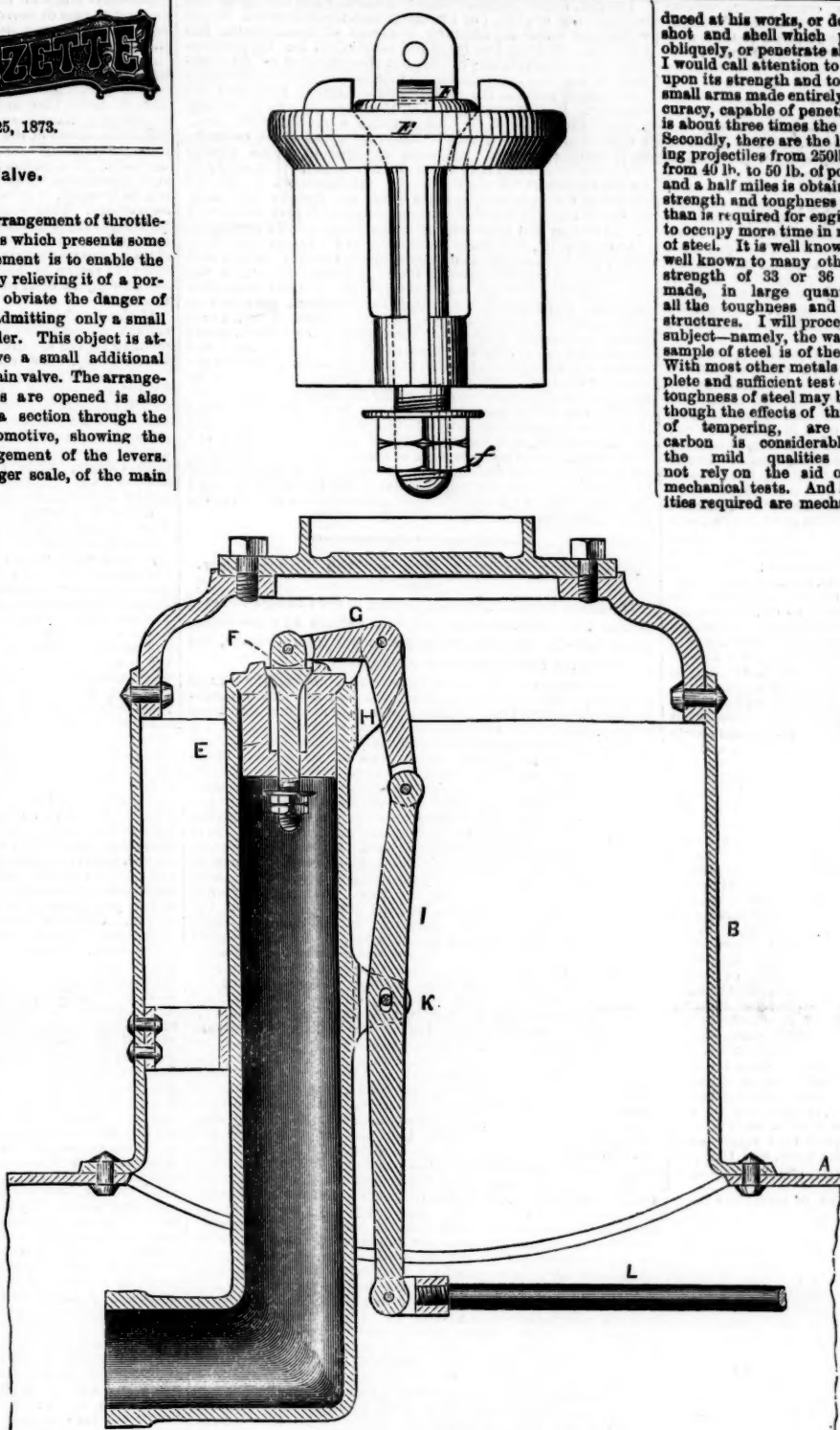
Another element of uncertainty appears to be that, in these modern and rapidly-made steels, the precise time allotted to the several stages of the process, the degree of heat employed, and a variety of other circumstances, have to be carefully observed, and any inaccuracy in carrying out the required conditions affects the quality of steel produced. Nevertheless it is known that in the Bessemer process, if ores or metal of suitable chemical qualities are used, and the process of manipulation is properly performed, the quality of metal produced is certain and regular in its results. In the processes of Dr. Siemens there is not the same necessity for purity in the ore or metal required, the nature of the process being, I believe, such as to eliminate some of the ingredients which would prevent toughness being obtained, while tests may be made during the process of manipulation so as to ascertain that the metal is of the quality sought before it is run off into the ingot mould. Where large castings and metal of great solidity are required, as in making large guns, there is the method pursued by Sir J. Whitworth, whereby the metal is intensely compressed while in a fluid state. The pressure employed is twenty tons per inch, and its effect in producing solidification is such as to shorten the ingot about 1½ inches for every foot of length. The treatment by compression is especially important where metal is required in large masses and of great ductility, because the larger the mass and the greater the ductility, the larger and more numerous are the air-cells, and the effect of the pressure is to completely close these cells and render the metal perfectly solid. By this process mild steel can be made with a strength of 40 tons to the inch, having a degree of ductility equal to that of the best iron. The more highly carbonized qualities, whose strengths range from 48 up to 72 tons per inch, show a decrease of ductility somewhat in the same ratio as the strength increases.

Without going into the numerous achievements of Sir Joseph Whitworth, resulting from the employment of steel, in connection with the extreme accuracy of workmanship pro-

duced at his works, or doing more than mention the flat-ended shot and shell which pass through iron plates when fired obliquely, or penetrate ships' sides below the level of the water, I would call attention to those applications of steel which bear upon its strength and toughness. In the first place, there are small arms made entirely of steel, of wonderful range and accuracy, capable of penetrating thirty-four inch planks, which is about three times the penetrating power of the Enfield rifle. Secondly, there are the large guns, also entirely of steel, throwing projectiles from 250lb. to 310lb. in weight, and burning from 40 lb. to 50 lb. of powder, with which a range of nearly six and a half miles is obtained. In both cases the degree of strength and toughness required in the metal is much greater than is required for engineering structures. It is unnecessary to occupy more time in multiplying examples of the toughness of steel. It is well known to manufacturers, and must also be well known to many others here present, that steel of the strength of 33 or 36 tons per inch can be made, and is made, in large quantities at moderate price, possessing all the toughness and malleability required in engineering structures. I will proceed, therefore, to the second part of the subject—namely, the want of means of knowing that a given sample of steel is of the quality suited for structural purposes. With most other metals chemical analysis is in itself a complete and sufficient test of quality, but in steel it is not so. The toughness of steel may be altered by sudden cooling; and although the effects of this operation, and generally the effects of tempering, are greater when the quantity of carbon is considerable, yet it acts more or less in the mild qualities of steel; so that we cannot rely on the aid of the chemist, but must fall back on mechanical tests. And in point of fact, seeing that the qualities required are mechanical, it is more than reasonable that the test should be mechanical; for this includes not only the test of material but of workmanship. Now there are two descriptions of mechanical testing, which may be distinguished as destructive and non-destructive—the one being beyond and the other within the elastic limit of the material. The destructive test is that usually applied to a part of an article manufactured, as for example, a piece cut off a boiler plate tested by absolute rupture, or by bending or otherwise, whereby the strength and quality of the material in the plate is known. The non-destructive test is that usually applied to the finished work as in the test of a boiler by hydraulic pressure, or the testing of a gun by the proof charge. The strain in this case is made greater than that which will arise in the daily use of the article, but is not so greatly in excess as to be beyond the elastic limit of the material. As regards engineering structures this second test is easy of application, but it affords no sufficient criterion that the metal possesses that degree of toughness necessary to resist the action of sudden strains. It may be said that engineers may ascertain for themselves, by inspection and testing at the works, that they are being supplied with the material they require; but assuming that the tests and mode of testing were in all respects satisfactory to them, and that the metal supplied was of the right quality, we have still to comply with the conditions prescribed by the Act for the Regulation of Railways, and we must satisfy the Government inspector.

It is not to be supposed that he can attend all the required tests at the works, and the question remains, how is the inspecting officer of the Board of Trade to be enabled to distinguish the quality of metal in a finished bridge when he is called upon to give a certificate that it is safe for public traffic? If we could adduce clear and distinct evidence that the metal used for a bridge was of a quality which would bear eight tons to the inch with as much safety as common iron can bear five tons, there can be no reasonable doubt that the Board of Trade would make suitable provision in its regulations for the employment of

such material. The difficulty lies in the wanting of something whereby the quality of the metal may be known and relied upon with confidence by others besides those who made the article. In gold and silver this is accomplished by the stamp put upon them, in guns and small arms we have the proof-mark, but in iron and steel we have nothing whereby the one quality of metal can be distinguished from another; and until some sufficient means be devised for this purpose, it is difficult to see how we are to escape from the position in which we are now placed—namely, that while we possess a material by which we can increase considerably the spans and diminish the weight and cost of engineering works, we are restricted to make designs and construct our works by a rule made for wrought iron, and adapted to the lowest quality of that material. As the rule made by the Board of Trade in respect of wrought-iron railway structures may not be generally known, I here give it: "In a wrought-iron bridge, the greatest load which can be brought upon it added, to the weight of the superstructure, should not produce a greater strain on any part of the material than five tons per inch." It will be observed that this five tons per inch is the governing element, irrespective entirely of the quality of the metal used; and it is obvious that a rule so framed must act as a discouragement to any endeavor to improve the quality of metal, while it tends to induce the employment of the cheapest and most inferior descriptions which can be made under the name of wrought iron. In endeavoring to seek an amendment of the rules, which will permit of the employment of steel or other metal of higher strength than five tons to the inch, I feel bound to say that I do not consider that the Board of Trade is alone responsible for the position in which the question now stands; and, as regards the Government inspecting officers, I can only say that in the numerous transactions I have had with them, and, although differences of opinion have occasionally arisen, yet, considering the responsibility which rests upon them, I have found them anxious to afford all reasonable facilities so far as put our testing on a systematic and satisfactory basis. The second is to establish some means whereby metal which has been tested can have its quality indicated upon it in such manner that it can practically be relied upon. The experiments before referred to establish, sufficiently for all practical purposes, that the relation, or propor-



WATKEY'S THROTTLE-VALVE.



tion between the resistance to tension, compression, torsion and transverse strains is about the same in steel as in wrought iron. The testing required is therefore reduced to that necessary for ascertaining two properties only, namely, the strength and toughness or ductility. The strength may be readily ascertained, and no difficulty arises on that head. The whole question turns upon the test for ductility, or the resistance to fracture by blows or sudden strains: and it must be admitted that the tests employed for this purpose are not framed on any regular or satisfactory basis. I may mention as an example the test of rails by a falling weight. In the first place, as usually applied, it is made a destructive test, the weight and fall being such as to bend and render the rail unfit for use, however good its quality may be. Secondly, being a destructive test, it is applied only to 1 or 2 per cent. of the quantity; and if this amount bear the test, the remainder are assumed to be like them. I have recently had occasion to know, in a case which came before me respecting iron rails, that this assumption may be entirely fallacious. Again we find 10 cwt. to 15 cwt. falling 5 ft. used for iron rails, while one ton falling 20 ft. and sometimes 30 ft., is specified for steel, and yet both descriptions of rail are called upon to perform the same work when laid down in the road.

I believe the falling weight, or, in other words, the test by impact, to be a good and searching test for detecting brittleness; and it has the advantage of being cheap, quick and easy of application, but it is questionable if it is applied in the best manner. Except in cases of accident, when an engine or train leaves the line, rails of the weight now used in permanent way are never known to be bent by the passing of trains, but brittle rails will break. The weight on the driving-wheel of a large engine is about eight tons, the amount of vertical fall in passing along the line is necessarily very small and we know by experience that this large weight with this small fall is sufficient to break inferior rails without destroying the good ones unbent and unbroken. What we require of the test by impact is that it should be so arranged as to do what the engines do, detect the brittle rails without destroying the good ones; whereas, as now applied, it destroys the 1 or 2 per cent. of the rails submitted to the test, however good they may be, while it gives no information whatever regarding the remaining 98 or 99 per cent. of the quantity. Another test for toughness or ductility which is very useful is the extension of the metal beyond the limit of elasticity. In testing his fluid-compressed steel, Sir Joseph Whitworth employs this test upon a piece of the metal 6 in. in length. For a length of 2 in. at each end a screw is cut for the purpose of enabling the hydraulic apparatus to bring the strain to bear on the sample. The remaining 2 in. between the screwed portions is accurately turned down until the sectional area is exactly 5 in. The sample is now subjected to strain, and the recorded extension occasioned by the strain at the moment of rupture is treated as percentage or proportion of the 2 in. between the screws, and is described as the *percentage of ductility*. But it is obvious the measure of ductility so obtained has reference to the particular length and dimensions of the specimen, and would be altogether varied if a long bar were tested instead of a short one. There is, however, another evidence of ductility which, within certain limits, is independent of length—that is, the diminution of sectional area which takes place at the point of rupture—and the ratio which the original sectional area of the bar bears to the sectional area of the fractured end appears to afford a more definite measure of ductility. Thus, in the experiments of Mr. Kirkaldy, previously referred to, it appears that in bars 50 in. long and 1 3/8 in. diameter, the sectional area of the fractured end was in some cases less than five-tenths of the original section. In the bars broken by the committee, which were 14 ft. long and 1 1/2 in. in diameter, it was in the best samples under six-tenths, while the best qualities of wrought iron similarly treated showed a ratio of about five-tenths. It is to be observed that such a degree of ductility as is presented by these samples is not needed in engineering structures, the wrought iron frequently used, and I may say generally used, for these purposes being of much less ductility. Without, however, attempting to say what description of test may be found the best for ascertaining the property of ductility, it may be observed that what is required for this test is a definite basis to act upon, and that the samples should be so made as to render the test cheap, expeditious and easy of application.

The next requirement is that when a piece of metal has been tested, and its qualities of strength and toughness ascertained, there should be some means of denoting its quality in an authentic manner. To a certain extent this is already done in iron by the mark of the maker; but something more than this is necessary to fulfill the required conditions in steel. What is termed steel is iron with a small proportion of carbon in it. These two ingredients are necessary to constitute steel; and there may or may not be present in very small quantities graphite, silicon, manganese, sulphur and phosphorus. In connection with the experiments made by the committee, 14 of the samples were tested by Mr. E. Richards, of the Barrow Steel Works, five of which were kindly repeated by Dr. Odling. Although there are some discrepancies in the results which we cannot account for, yet some of the characteristics are brought out clearly. It appears that manganese may be present to the extent of four-tenths per cent. without injury either to the strength or ductility, but sulphur and phosphorus, except in extremely small quantities, are fatal to ductility. In the samples tried by the committee and Mr. Kirkaldy, the quantity of carbon varied from 1/2 per cent. to nearly 1 per cent.; yet with this small variation in the carbon the strength ranged from 33 tons to nearly 53 tons per inch; and the ductility, represented by the ratio which the fractured area bore to the original section of the bar, varied from five-tenths in the tough qualities, until in the harder samples there was no diminution perceptible. All these materials are called steel, and have the same external appearance; but possessing, as they do, such a range of strength and such a variation in ductility, it becomes absolutely essential that there should be some classification or means of knowing the respective qualities among them.

The want of such classification casts an air of uncertainty over the whole question of steel, and impedes its application. To this want of knowledge is to be ascribed the circumstance that many professional men regard the material as altogether unreliable; while large consumers of steel, in consequence of the uncertainty of the quality they buy in the market, seek to establish works on their own premises and make their own steel. This step has already been taken by one of the large railway companies, and is, as I am informed, contemplated by one of the principal constructive departments of the Government.

My attention has been recently and forcibly directed to the importance of steel through having been called upon, in conjunction with Mr. Bidder, Sir John Hawkshaw, Mr. Harrison and Dr. Poole, to report upon the magnificent work designed by Mr. Bouch for crossing the Frith of Forth. This great work consists of a stiffened suspension bridge in two spans, each of 1,600 feet between the supports. To construct this work in iron, with a working strain of five tons to the inch, would involve such weights of material and magnitude of strain as to render it virtually impracticable; but in tough steel, capable of bearing eight tons per inch, it is practicable to accomplish it and even larger spans. Mr. Bouch has designed the chains of this bridge to be made of steel; and in addition to the honor which must attach to his name as the originator of this great and important work, he is further entitled to the merit of being the first engineer to break through the restrictions which confine our engineering structures to wrought iron, and to brave the difficulties which surround the employment of steel for railway works in this country.

I ought, I know, to apologize for detaining you so long on this one question of steel, but I consider that the difficulties under which it is placed are affecting interests of considerable importance. Not only is a large and useful field for the employment of steel practically closed, but the progress of improvement in engineering structure is impeded both in this country and in other parts of the world where English engineers are engaged. For, in consequence of the impediments to its employment in England, very few English engineers turn their attention to the use of steel. They are accustomed to make their designs for iron, and when engaged in works abroad where the Board of Trade rules do not apply, they continue for the most part to send out the old-fashioned ponderous girders of common iron, in cases where the freight and difficulties of carriage make it extremely desuabie that structures of less weight and more easy of transport should be employed.

In conclusion, and while thanking you for the patience with which you have heard me on this subject, I would observe that we possess in steel a material which has been proved, by the numerous uses to which it is applied, to be of great capability and value; we know that it is used for structural purposes in other countries, as for example, in the Illinois & St. Louis Bridge in America, a bridge of three arches, each 500 ft. span; yet in this country, where "modern steel" has originated and has been brought to its present state of perfection, we are obstructed by some deficiency in our own arrangements, and by the absence of suitable regulations by the Board of Trade, from making use of it in engineering works. And I have considered it right to draw your attention to the position in which this question stands, well knowing that I could not address any body of gentlemen more capable of improving and systematizing our methods of testing or better able to devise effectual means for removing the impediments to the use of steel, than are to be found in the scientific and practical men who form the Mechanical Section of the British Association.

#### Views of a Railroad Man on the Illinois Law.

The following letter, which appeared in the Chicago Times of October 9, we understand to have been written by a gentleman particularly familiar with the traffic to and from Chicago, and also with the Illinois laws and their effects:

The extension of the railway system to points on the utmost verge of profitable production has awakened a demand for reduced charges for transportation, and this demand has been most earnest in the far Western States, where nearly all the roads are quite as unprofitable as farming. The grangers are most numerous in Iowa, in which State three roads out of fifteen pay dividends. The complaints have traveled eastwardly, and there is much agitation in Illinois, where it is constantly fanned by traveling speakers and politicians. Illinois is the grand center of the Western railroad system, and Chicago the principal point of railroad receipts and lake shipments. It is not surprising that in the change from railroad investments, which were at first unprofitable and in many cases ruinous to the promoters, to an era of comparative prosperity, many of the railroads were for a time managed by unscrupulous speculators, who had as little regard for the stockholders as for the farmers or merchants. This condition of things has now passed away, in the management of the roads terminating in Chicago, and none of the roads are now managed by men who are interested in elevators, hotels, eating-houses, mines, and other enterprises to which the interests of stockholders were once made subservient. We challenge the world "and all the rest of mankind" to exhibit a railroad management equal to that of the roads now terminating in Chicago. Come, farmer, merchant, lawyer, priest or banker, and examine our railroad managers. The Pittsburgh, Fort Wayne & Chicago is managed in Pittsburgh. Mr. Paine, General Superintendent of the Lake Shore, is in Cleveland. In Chicago we have Mr. Walker, President, and Mr. Harris, Superintendent of the Chicago, Burlington & Quincy. Henry Sargent answers for the Michigan Central. Mr. Blackstone and Mr. McMullen have the Chicago & Alton. Mr. Newell, of the Illinois Central, Mr. Riddle, Vice-President and Superintendent of the Chicago, Rock Island & Pacific, and Mr. Keep, President, and Mr. Hught, Superintendent of the Northwestern, and every man is in his office or on the road every day; and not one of these men has a superior, and not one has ever been even suspected of a corrupt practice. So much for the men; and now for the complaints against the system—and we wish to treat this matter fairly and candidly. No person looking at the map of Illinois can for a moment entertain the idea that there is any lack of competition. There cannot be the idea that there is any railroad transportation in a State where you can scarcely find any place of 15 miles square without two competing roads, and a law forbidding any combination of parallel roads. On account of some really speculative management of railroads during the rapid development which followed the war, the framers of the new constitution in 1870 passed a constitutional provision requiring the Legislature to prevent by an act any "unjust discrimination" in railroad charges. Long before this constitutional convention "unjust discrimination" had been decided by the courts in this country and England to be opposed to public policy and illegal. Such has been the common law since the days of Elizabeth. The Legislature of Illinois in 1870 enacted a law against any and all discrimination. The attempt was made to prevent any road in Illinois from discriminating between a coal mine station and a water tank stopping place, which might possibly receive a half car load a month, and the city of Springfield or St. Louis or Quincy, to which might be dispatched a dozen full through trains daily. To railroad men no other statement to exhibit the gross absurdity of the law is necessary. Unhappily our Legislatures are not frequented by experts in railroad or any other matters. Our legislators may be honest but they are not skillful. In this act they overstepped the mark. The act coming before the Supreme Court of the State, that very august body declared the act wholly impracticable, and not in accordance with the constitutional requirement which demanded a suppression of "unjust discrimination." If the court had stopped at this point it would have been entitled to the respect of all, but in these days of hungering for office even an elective judiciary is human and could not omit the occasion for a stump speech to the people and the Legislature then in session. The decision was right, but the written opinion was not creditable to the State or its judiciary. The court put forth an electioneering document alike disgusting the farmers and those more intimately acquainted with railway management. The case before the court was on a charge by the Railway Commissioners of the State against the Chicago & Alton Railroad Company, for charging five dollars per M. on lumber from Chicago to Bloomington, while the charge by the same road to Lexington, sixteen miles nearer to Chicago, was five dollars and sixty cents per M. It was admitted that the charge to Lexington was reasonable, and no more, and it was, in fact, in accordance with the charges of all other roads for like transportation under similar circumstances. The charge to Bloomington was made because two roads were competing for that business, which roads could not at the same time agree on a tariff. The Supreme Court of Illinois, after emphatically contending, arguing, and declaring in a tremendously long rignarole of words, which were apparently intended more for the farmers' votes than for their minds, that this was an "unjust discrimination" such as contemplated by the constitution; that a discrimination between towns wholly unlike in their position and circumstances was as unjust as discrimination between two

passengers taken in the same cars to the same locality, or between two cars of merchandise sent to two merchants in the same place, propounded what might not be an "unjust discrimination" in the following words:

"Take for instance the road of the appellant with one terminus at Chicago and the other at East St. Louis. At one season of the year more freights are running from Chicago toward East St. Louis than in the opposite direction. The consequence of course is that the supply of empty cars at the latter point will be in excess of the demand. There is a water route between these points which also touches several intermediate stations upon the road. Now unless the railway company is permitted under such circumstances to induce shipments over its line by lowering its freights, it is evident that a portion of its cars will return empty. This would of course necessitate a higher charge for freight moving toward St. Louis than it would be necessary to impose if return freights could be secured by lowering the rates on the return trip. To forbid the company to lower the rates of return freights would thus benefit no one, and would work an injury both to the company and to the people along the line."

If the members of the Supreme Court had any knowledge of railway business they would have been ashamed of this argument in regard to the "unjust discrimination" in favor of Bloomington. But clinging to their foolish argument, the Court advised the Legislature to amend the act in accordance with the constitution, and thereupon the Legislature passed a new act forbidding "unjust discrimination" and making any and all discrimination between local and through freight or passengers *prima facie* evidence of *injustice*, and fixing a penalty for any such discrimination at from \$5,000 to \$50,000 for each offence, while the mild penalty under the former act was a simple forfeiture of charter which would have involved several millions of dollars.

Under this latter act the Railroad Commissioners were ordered to adjust the rates for all roads upon an exact proportion of charge to tons and mileage, so that we now have the exact rate to a water-tank or a blacksmith shop within ten miles of Chicago graded down to the same rate to which water communication and competing roads may force the Chicago & Alton Railroad to accept freight to or from St. Louis or Bloomington. The fractions of miles are settled by fractions of cents, and it would require a keen arithmetical scholar to be always correct in making out the bills. A few plain statements in regard to the practical working of a railroad will show the wholly impracticable nature of this last legislative act. In the month of July last, the Chicago & Alton Railroad received at Chicago 7,999 cars, of which 7,585 were loaded and 414 empty; and in the same month sent out of Chicago 8,702 cars, of which 3,308 were loaded and 5,394 were empty. Of course, this requires an adjustment, which will keep the wheels moving the most rapidly and produce the best results, both as to economy and profit. Such an adjustment necessarily requires the company to obtain whatever compensation it can for a return freight so as to reduce the charges required for the round trip. It is evident to every one that on such an enormous proportion of empty cars which are necessarily moved, the very circumstances stated by the Supreme Court occur when a railroad might properly lower its rates to induce shipments, and this not by a general revision of its rates, but at the particular points where the necessity or opportunity occurs. Unjust discriminations and excessive rates are frequently conjoined, but they are based upon entirely different foundations. If a person is charged a rate entirely reasonable and no more, while his neighbor under the same circumstances is charged less, the complaint is of unjust discrimination. If both, however, are, under the same circumstances, charged an unreasonable rate, the complaint would be of extortion. The first and last acts of the Legislature are alike intended to prevent all discriminations. The only difference exists, in the first exacting a penalty without trial, and the second making any discrimination *prima facie* evidence that it was willfully unjust. Discriminations exist in everything. The granting of a charter is a discrimination in favor of one set of corporators against another. The location of a railroad is a discrimination in favor of certain communities and against others. The farmer located ten or twenty miles from the road is severely discriminated against in favor of his more fortunate acquaintance near the depot. The complaint is that a small village, with one hundred inhabitants, is not treated on a perfect equality with the city of St. Louis and other cities. For example, the rate to and from St. Louis, where there is great competition by chartered land companies and chartered water navigation companies, must be graded up to enable the road to transact the village business at a lower rate, or the village rate must be graded down to the extreme point, so as to enable the company to obtain the St. Louis business. It abandons the principle of the cost of the business at each point and also the market value of freights; and wholly for the sake of equalizing a tavern, a church and a blacksmith shop with a magnificent city and the center of a dozen radiating roads it sets up an arbitrary rule of apportionment. Why should St. Louis and the States west and south of that city be made to pay one farthing toward building up the village of Towanda, a hundred miles from Chicago, and yet that would be the practical effect of this law if carried out. If St. Louis had no other outlet than the Chicago & Alton Railroad, St. Louis rates would be raised; but St. Louis having other outlets which force down the rates, the village of Towanda obtains a rate far less than the cost of transportation. Take the practical working of the railroad business. A train leaves Chicago in the evening destined for East St. Louis. It has cars loaded with way freight to be distributed between Joliet and Bloomington. These cars are left at Joliet until morning; they are then sent along in a distributing day train, and may reach Bloomington the same evening, or if delayed, not reach there until next day. The way cars cannot be unloaded at small stations at night unless by incurring a large additional expense on a very small freight. In the meantime the through train has, stopping only at Bloomington, Springfield and Alton, reached St. Louis, been discharged, and the cars are back in Chicago and reloading before these way-cars leave Bloomington to return. The train has traveled five hundred miles while the way-cars have traveled one hundred. There is no equality about the matter unless you force it by sacrificing the greater interest to the lesser. The through business by its magnitude, its steadiness, and constantly moving character can be done for much less than the cost of the way business. Yet in the face of these facts the Supreme Court advised the Legislature to pass a law making a discriminating charge *prima facie* evidence of unjust discrimination. As the Supreme Court rendered advice without seeking information, it is the duty of the Legislature to inform themselves in regard to the practical working of this law. The railroad managers are anxious to avoid unjust discriminations, in order to obtain business, and if they were not, the courts would compel them so to do. No statute is required to adjust it.

In many cases in England and in this country a maximum rate has been established by the charter incorporating the company, but never by general law. Such maximum has had some regard to the cost of doing the business, but such maximum has had but little if any effect upon the rates established by the companies, for the reason that no company thought of charging the maximum rate allowed. No rule applicable to all roads is practicable. A coal road, a lumber road, a grain road and a passenger road, or roads upon which such different business forms the chief source of profit are essentially different. What is a profitable rate on the New York Central would not yield any profit on any Illinois road, and a road in Nebraska forced down to the rates of the Chicago & Alton could not move its trains. What is a reasonable rate at one time would, with a



## FAIR PLAY.

Master Mechanics of all American railroads are invited to send us their monthly reports for this table

HALF YEAR ENDING JUNE 30, 1873.

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Published Every Saturday.

CONDUCTED BY

S. WRIGHT DUNNING AND M. N. FORNEY.

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## RAILROAD ECONOMY.

There is no time so favorable for the formation of good resolutions as a period of sickness. Place a person helpless on his back, with no other occupation than his own thoughts and sufferings, and he at once begins to reflect on the uncertain tenure of life, to review the past and to determine that in the future he will mend his ways. We are all prone to forget in prosperous times the importance of economy, or, in the language of one of the funny men, "when you hold the winning card, that's the time to play the keeferfullest." So it is with railroads, too. When the earnings are good, expenditures are apt to be lavish, partly from necessity, but also to a considerable extent from a sort of involuntary relaxation of purse strings. Let a period of financial distress and general disorder and depression of business come on, so that expenses begin to tread uncomfortably close on the heels of receipts, and the involuntary relaxation is apt to be changed to a spasmodic and painful contraction of expenditure. Now, undoubtedly—as most of us have learned, perhaps, somewhat bitterly—it is not only wise but necessary to adjust our outgo to the proportions of our income, but in doing so, we have probably had occasion to realize that the smaller the income the greater the exercise of wisdom which is demanded in its expenditure to accomplish the ends in view. It is just so with the expenses of railroads. When the business leaves a liberal margin between receipts and the cost of operating, it is not so necessary to watch every expenditure so closely to see that it is applied to the best advantage as it is when there is less money to spend. Now, obviously, there is such a thing as a blind and stupid curtailment of expenses. In order to save a hundred dollars a thousand may be lost. To illustrate, we know of one road in which the fuel accounts are kept in a very careless way because those high in authority are not willing to pay enough to secure the services of fuel agents with sufficient intelligence and capacity to keep the accounts correctly. Now the waste of fuel which must ensue on a road with several hundred locomotives, if those who run them have no feeling of personal accountability, would pay the expense of careful agents to keep the accounts ten times over. A careful record has also another good effect: it reveals the defects of both the engines and the men who run them. On another road we know of, each engine is carefully charged with every ton of coal it uses. Whenever any of them showed a very heavy fuel consumption, an experienced person, whose special duty it was, examined the working of the engine and its management by the men, and if possible discovered the defects, if any existed, which of course was the preliminary step in order to effect a remedy. The good effect of keeping correct fuel accounts is thus two-fold—it creates a feeling of personal responsibility in the locomotive runners, and it reveals to the master mechanic or person in charge of them which engines and which men are working economically, and which are not. Now to attempt economy by cutting off the expense of keeping competent men in charge of the fuel accounts is a little like dispensing with a cashier and cash account in order to save money. Every business man knows that unless a very strict account is kept of the disposition of every dollar, a good deal of money will be wasted. The same thing is true of fuel.

Or, we will take the much-talked-of and frequently-discussed subject of dead-weight of cars. The majority of railroad officers, we regret to say, have very indefinite ideas of the cost of carrying dead weight, and most of them seem to be quite indifferent about it. Last week we attempted to show that the cost, in certain circumstances, is about one third of a cent per ton per mile, so that if the weight of a freight car is reduced one ton and

it runs 75 miles per day for 300 days in a year, the saving in cost of transportation would be \$75 per year. For a thousand cars this would of course amount to \$75,000 per year. But there is another consideration to be taken into account. There is nothing so expensive to railroads as accidents. Now, if in order to reduce the weight of cars their strength must be diminished, so that there is danger of their breaking down, the probability is that the expense incurred from the latter cause will be very much greater than the saving from a reduction in weight. Therefore, in order to make the first saving possible, there must be a sufficient amount of skill in the person who designs the cars to reduce their weight without reducing their strength. Now supposing, what is not an unusual case, that in order to economize, the first step be to reduce salaries, and that the master car-builders be cut down so much as to make it to his interest, if he be a person of much skill, to seek employment elsewhere; if he leaves and some blunderhead be put in his place, it will not be long before his want of skill will make an increase of strength and weight of cars necessary, at a cost already estimated.

We do not of course mean to say that a reduction of salaries may not be a legitimate method of economizing. What we want to make plain is, that a reduction below the point which the skill that is required commands in the market, is not economy. Skill and business ability, like merchandise, increases in price with the demand, and a railroad company in prosperous times may be obliged to pay much more for first-rate talent than it must when business is more depressed.

Let us take another case. To the average railroad director nothing seems simpler than to reduce expenses by refusing to buy new rails for the repair of the road. To him the use of the old rails seems as easy and as safe a means of economy as the wearing of an old coat or last year's hat; and the reduction of the track repair force often means no more, in ultimate results, than the dismissal of one of many household servants does to his wife. Unfortunately, however, as soon as the track is allowed to get out of good repair, a railroad company must encounter the risk of accidents, which we have before spoken of as being more expensive than anything else. Nor does the expense end here. If the track is bad, the wear and tear to engines and cars and the cost of repairs are consequently much increased. With the increased wear and tear, there is a necessity for greater strength, and consequently of an increase of weight of cars; and thus the evil and expense of increased dead weight follow of necessity. Now, obviously it is not true economy to decrease the expenses of track repairs so as to get the road in bad condition, and yet this is exactly what has, and probably will be, done, on a large number of roads this winter.

One of the most difficult branches of business to succeed in is the manufacture of machinery. The opportunities for waste of labor and material, the necessity for the exercise of ingenuity and skill yet restrained by the clearest common sense, the great variety of detail, the numberless causes of loss and the frequent and violent fluctuations of business make not only a high order of mechanical skill, but an equal degree of business ability, necessary for success. Now, excepting perhaps the disturbance due to the fluctuations of business, the management of a large railroad machine shop requires quite as much skill and economy of management as a private establishment. Or perhaps we should say that skillful management will be quite as fertile of results in the one establishment as in the other. If the one be conducted badly, pecuniary loss will speedily result; in the other it shows itself only in an increase of expenses. Now, clearly, to curtail the expenses of a business so complicated as that of a large machine shop, and yet have the necessary repairs go on as economically as possible, requires a very complete knowledge of all the details, such as only a person who conducts the business can have. If therefore expenses must be reduced, it should be only after careful investigation and consultation with those in charge of the work. Master mechanics are often made the subjects of arbitrary orders issued by superior officers which would be materially modified did the latter comprehend clearly the condition of things, which he controls with so little inconvenience to himself but often so much hardship to those under him.

It very often happens, too, that the subordinate officers, engineers, superintendents of machinery and others have a very inadequate idea of the difficulty of getting money to carry on their work. The man who has great difficulty in moving the trains over a piece of single-track road cannot understand why a double track should not be constructed, and a master mechanic interprets it as sheer stupidity that the powers above him will not increase the motive power when he is so sorely tried to provide what is needed for the crowded business at certain seasons of the year. If he knew the difficulty of supplying the requisite funds for keeping things moving,

he would find that his task is comparatively easy. On one road that we know of, monthly meetings of its officers are held at which the interests, duties and requirements of each department are discussed. We know of no system so likely to promote harmony, so certain of creating a mutual comprehension of their different relations, or which will aid so much in effecting a wise reduction of expenses, if a reduction is necessary. It is said that this system was one secret of the great success of one of the most profitable newspapers in this country. The proprietor held each day a conference with his subordinates, and thus reaped the advantage of their collective wisdom. To know thoroughly all the details of railroad operation and management is, it is true, not within the bounds of human capacity. The difficulty is, that so many railroad managers do not realize this, and, in their blind lust for power, assume to direct what should be delegated, or at least referred to, others who are acquainted with all the details of the special branch to which it refers.

The necessity for greater economy grows more pressing daily, and probably on all our roads there will be a great reduction of expenditure this winter. If all curtailments should be the subject of mutual consultation, it would, we are sure, be more effective, and the money which now does the least good would be saved, instead of that whose expenditure yields a profitable return.

## Long Island Traffic.

Long Island is, roughly speaking, a long, narrow parallelogram, the western end of which abuts against Manhattan Island and the upper harbor of New York, while the eastern end is about due south of the mouth of the Thames and the town of New London. The New York end is about 15 miles wide and the extreme width of the island proper is not more than 20 miles, though the islands and beaches of the southern shore extend a few miles further seaward in some places. The extreme length of the island on the southern shore (which is 15 or 20 miles the longest, and so spoils the exactness of our parallelogram) is 120 miles, within a mile or two.

Now this long and narrow strip of land south of the Connecticut coast and separated by a comparatively narrow channel from the commercial metropolis of the country has been, since the days of railroads, comparatively isolated. We do not mean that it is not easily accessible: you can go there in five minutes and for one cent from the city of New York, which in reality has flowed over upon the adjoining Long Island shore, and, in the city of Brooklyn has nearly half a million of people there. What we mean is, that it is on no thoroughfare between other parts of the country, and consequently people very rarely pass over Long Island unless they are bound to some place on Long Island. This is a very important difference. The man who travels from New York to St. Louis and back, may see on his way eight of the richest and most populous States, manufacturing, mining and agricultural, and the Province of Ontario also, and pass through the four largest cities in the country, and three times as many of secondary rank. It is true that the impressions received on a flying trip are slight and can give little idea of more than the mere surface of the country; but they are incomparably more definite than impressions received by reading only; and the mention of the name of a little town where one may have got a cup of tea, or asked a few questions while the train waited, calls up a picture and impresses one's sense of locality quite vividly.

Moreover, the places traveled through are the places talked about, and in these days of newspapers and letter writers almost every town or place worthy of note (and a great many that are not) which lies on a thoroughfare is talked about and written about until the most of us get some impressions approaching the truth concerning the greater part of the country. But when a place is at the end of a route which is not a thoroughfare, or in some nook, peninsula or island which one sees only when he goes for that purpose, it becomes comparatively indefinite, though ever so well known, in men's minds.

Now Long Island, with the sound on one side and the illimitable ocean on the other, never lacked "facilities for transportation." It was always comparatively easy to get to market from its most interior recesses even in the days of the early Dutch settlers. And of late days it has had added railroad lines in abundance, which in the western half of the island leave scarcely an acre of ground more than five miles from a railroad track. People can (and do abundantly) go to and leave the island; but to a very slight extent do they go across it: so those who touch its sacred soil are to an extraordinary extent confined to Long Islanders themselves, their relatives and other visitors, and the New Yorkers who go to fish and bathe on its coasts.

But it is not the worst of evils to be at one side of the great highways. Indeed, such comparative re-



tiement is a thing in itself altogether desirable to a great many people, to busy city people especially, and most especially when the retirement can be exchanged for the heart of business and bustle at almost any hour, in a few minutes, and by comfortable and cheap carriage. And as Long Island has but the narrow East River between it and the business heart of the continent, it seems after all the right island in the right place, if we may so express ourselves.

Accessibility and quiet are, of course, not the sole qualifications necessary to make a district desirable for residence. If we were to attempt to describe minutely the other qualifications of Long Island for this purpose, we should doubtless offend the dealers in suburban property everywhere else (and there also: for the race brooks no faint praise, and will accept nothing less than entire devotion), and besides would need to study the subject more than we have or are likely to until we become buyers or sellers of Long Island cities or parts thereof. We may say safely, however, that the south shore of the island is for the most part low and sandy, with long narrow islands and peninsulas parallel to it nearly its whole length, separated from the main land by shallow, still lagoons, and from each other by large and rather shallow bays, famed for oysters, clams and other fish, and affording at many places the very best beaches for surf and still sea-bathing, as at Rockaway, Fire Island, etc. Generally vegetation cannot be called luxuriant on this shore, and there is little variety of surface. The sea and the sea air, the sea bathing and sea fish, are its great attractions, and in the summer especially they attract many thousands, some for an afternoon and some for the season. Moreover, the fisheries on this coast provide a considerable industry—doubtless the chief one, as there are (or were in 1870) but five or six towns with as many as a thousand inhabitants on the whole shore, and none of these had as many as fifteen hundred.

The north shore of the island is quite different. It rises high and hilly over Long Island Sound and overlooks the opposite Connecticut shore. The soil too is comparatively strong; the shore is indented with numerous bays accessible by vessels, and the comparative still water of the Sound makes it easy to enter them, while there is a constant passing of vessels within easy reach on their way between New York and southern New England ports. It is more thickly peopled than the south shore, and has more and larger towns, which are chiefly within forty miles of New York.

The backbone of the island is for the most part not hilly, but quite level table land, with a light but warm soil, which, by the application of manure, to be had so plentifully from the city and the shores (fish), forms most excellent market gardens, to which no small part of the land there and on both shores is devoted. There are many very productive farms on the island, and here and there magnificent growths of forest trees, which are favored by the comparatively mild climate insured by the nearness of the sea; but as a whole the island can not be called fertile, compared with the Connecticut valley, the Genesee valley, or the Western prairies. Even were it exceptionally productive, it would hardly have tempted the construction of more than a single line of railroad were it not for its nearness to a great city. This has made it profitable to raise all kinds of small produce even on poor land, and many kinds which must be transported at the moment when they are ready for market and so rapidly as to reach it a few hours after gathering. Still the productions of the island, compared with its facilities for transportation, are trifling. Most of the fish never leave the fishermen's boats till they are delivered in New York. There are no noticeable mines or quarries, and no considerable manufactures, except in Brooklyn itself, and it is evident that if the 375 miles of railroad on the island (about one mile of road to four square miles of surface) depended chiefly or largely on the produce of the island for their income, they would fare but poorly.

But they were made and are chiefly used for suburban traffic. In 1870 the island had a population of 540,000 souls, more than 500,000 of whom were on the western end of the island, within forty miles of New York. Four-fifths of these, to be sure, were in the city of Brooklyn, and did not use the steam railroads much in their daily journeys, but except here, the west end of the island is covered with suburban towns, growing constantly and rapidly in number and in population, whose male inhabitants depend upon the railroads to make their daily journey to and from New York. So in examining the receipts of the Long Island railroads we find that instead of earning three or four times as much from freight as from passengers, as most American roads do, in all cases the passenger traffic is the most productive. On the Long Island Railroad, which extends the whole length of the island, and the longest part of which has no suburban traffic, the

passenger earnings are nearly one-sixth greater than the freight earnings; on the South Side they are more than one-half greater, on the Flushing & North Side they are nearly four times as great, and there are several short lines, usually counted as street railroads, but worked by steam and having an enormous traffic in summer—such as the Brooklyn, Bath & Coney Island, and the East New York & Canarsie—which have scarcely any freight traffic.

The object aimed at in constructing a railroad in Long Island is therefore usually the cultivation of a passenger traffic, the chief part of which will be suburban or excursion. And as, when a new road is constructed, nearly all this traffic must be created, or diverted from previously existing routes by competition, the companies—the later ones at least—have before them the difficult and complex problem of the development of towns. They must, in order to succeed, learn how to entice people from the city to buy land and build houses and fix their homes in quarters not new to them only, but new to all the world. It is the problem of the settlement of a new country over again, though the country may be on the borders of London or New York. There is no growth without an effort. There is no accession of people who come to be near their kinsfolk or friends, or to find work in shops and factories. This necessity of peopling new towns has of late years created a new profession, as it were. It is an art in which some men and corporations have acquired great skill, and one on which new Long Island railroads, it is plain, must largely depend for success.

And as a railroad for suburban traffic must inevitably profit the landholders on its line very much more than its stockholders, frequently increasing tenfold the market price of considerable tracts in the vicinity of stations, it is natural to expect and altogether proper that such roads should be largely constructed at the instance and cost of the land-owners, so that the land-holders are also the stock-holders. It is extremely difficult to give profits to whom profits are due otherwise; for a suburban railroad must usually sink money in developing traffic as well as in constructing its line before it can earn more than working expenses, and it might go on sinking money for a term of years, and after all never get satisfactory returns, while in a few years the profits of the land-owners might exceed ten times the cost of the line.

The chief existing Long Island railroads are the Long Island Railroad, which extends the entire length of the island from Hunter's Point to Green Point, with a long branch from Sag Harbor, a branch thirty miles long northeast to Post Jefferson (on the north shore), a short branch north to Glen Cove, and one south to Rockaway (south shore). The main line follows nearly the middle of the island, and was originally intended as a part of a "great through line" between New York and Boston. A "through line" it remains for a part of the year, but not by any means a great one, and doubtless the western part and the branches which have been made to suburban towns give it by far the largest part of its traffic.

The South Side is a later road. It was largely made for suburban and excursion traffic, and was laid through the principal towns (such as they were) on the south shore, and until recently had a monopoly of the heavy excursion traffic by rail to Rockaway. It is for the most part within five miles of the Long Island Railroad, ending for the present at the little village of Patchogue, about half way between Brooklyn and Montauk Point.

The Flushing & North Side is, we believe, a still later construction. It is, by itself, a short line, but it works several other companies' lines, which are virtually extensions or branches of it. Altogether it works now we believe, about 55 miles of railroad. One line is from Hunter's Point (opposite Thirty-fourth street, New York), northeastward about 18 miles through Flushing to Great Neck, touching several north shore villages. The other extends from a junction with the line at Flushing nearly due east nearly 25 miles, and thence southeastward about ten miles to the ancient town of Babylon, on the south shore opposite the famous watering place, Fire Island.

This part of the line is the property of two distinct corporations, the Central Railroad Company of Long Island, and the Central Railroad Extension Company, the latter of which has constructed this year the ten miles of the road west of Babylon, which was opened into that village with an excursion on Saturday, the 18th inst. The line of the former company has been much talked of as "A. T. Stewart's road." He is in fact a stockholder in the company, and probably a large one: he surely is if his interest in the stock is equal to his interest in the proper management of the road. For Mr. Stewart bought, a few years ago, an enormous tract of land known as

"Hempstead Plains," through which the Central Railroad passes for a distance of twelve miles, which has been hitherto uninhabited and unproductive, and the utilization of which depends almost entirely on this railroad. The ground was from time immemorial, and until Mr. Stewart bought it, the "common" of the town of Hempstead, and its only use was to pasture the Hempstead cattle. It is very like a level Illinois prairie, except in the scantiness of its vegetation, which finds to support it but two or three inches of soil over a loose gravel. It is capable of cultivation, however, and in the hands of owners would doubtless have been made profitable for market gardens. It is high, well-drained and should be very healthy. On this plain Mr. Stewart is building a town called "Garden City," which is, we believe, about five miles from Flushing and seventeen miles from New York. The work has been going on for two years or more, and there must be forty or fifty buildings completed, or nearly so, none of which are occupied, not having been offered for sale or to rent as yet. The dwellings are of three grades, the best (of which there are perhaps fifteen) being very large and costly, the second class roomy and plain, and the third cheap two-story structures which probably do not cost more than \$1,200 apiece. A large and handsome brick hotel is nearly completed, and a few stores are going up near the station. It is doubtless the largest new town in the world which has no inhabitants. Mr. Stewart does not say what he intends to do with it, but it is proper enough that the place should be finished in a measure before it is offered to inhabitants, so that when the first family comes it will find a town ready made and not waiting to grow.

Perhaps no new railroad was ever constructed in this country which was in so good condition when it left the hands of the contractors. The country, apparently, was made to build railroads in, for it is generally level, has few water courses, and those small, and you have nowhere to go far for ballast. But aside from natural advantages, great care has been taken in construction. The road-bed is wide and for the most part well ballasted, and ballasting is now being completed. The ties are very closely placed, the rails are heavy and all steel, the bridges iron (from the Watson Manufacturing Company), and the stations neat and convenient. Very few railroads can show a better track than this of the Central of Long Island.

The "Extension" completes a line diagonally across the island from the north shore at Flushing to the south shore at Babylon, and will enable the line to compete with the South Side Railroad for the excursion traffic to Fire Island, and also, doubtless, to cultivate one or two more suburban towns. It and the Central and the Flushing & North Side are under substantially the same management, and they form substantially one system, the older parts of which have succeeded well, while the newer parts, with due cultivation, will doubtless eventually carry a great many passengers to and from New York, and have flourishing villages at their stations, which will depend upon the railroads for their provisions fuel and most other supplies. With its admirable track it is able to make good speed and to compete on equal terms with the other roads with which it comes in contact, and its terminus is nearly opposite what way be called the "up-town center" of New York, from which probably the largest part of the commuters of the Long Island railroads come.

#### The Western Union Telegraph.

The Western Union Telegraph Company, at the close of its last fiscal year (June 30, 1873), owned and worked 65,757 miles of line, with 154,471 miles of wire, and 5,740 offices. This was represented by a bonded debt of \$6,038,400, and \$33,778,175 of stock outstanding (besides \$7,295,235 owned by the company.) Thus there was an average of about \$92 bonded debt and \$514 of stock per mile of line. The stock, at one time since the close of this fiscal year was sold for 90, but at this writing is less than 60, so that now the market price of the property (assuming the bonds to be worth par) cannot be put at more than \$400 per mile of line.

During the year there was an increase of 3,725 miles (6 per cent.) in length of lines, 17,281 miles (12½ per cent.) in length of wires, and 503 (9½ per cent.) in number of offices.

The income from the company's property, which we may assume to have included an average of 64,000 miles of line, was, for the fiscal year, \$9,339,018.51, or \$145.82 per mile; the working expenses \$6,575,055.82, or \$102.74 per mile (70.4 per cent.), and the net earnings \$2,757,962.69, or \$43.08 per mile. Not quite \$7 per mile is required to pay the interest on the bonded debt, and the \$36 per mile remaining was equivalent to just 7 per cent. on the capital stock outstanding, which is equal to nearly 8 per cent. on its highest market price, and to 12 per cent. on the present market price.

There was no dividend declared, however, as there has been none for three or four years, and the disposition of the surplus



shown in the income account reports \$1,212,206 expended during the year for the construction and purchase of new lines, \$63,214 for real estate, \$11,577 for the purchase of the stock of telegraph companies in its system, \$39,000 for stock of the "Western Electric Manufacturing Company," \$19,258 for a patent and \$402 for "miscellaneous" purposes. In all \$1,722,048.06 was expended for additions to the company's property, and a balance of \$1,035,512.13 remained—sufficient for a dividend of 3 per cent. on the stock outstanding.

Thus the company's property is seen to be equal both in capital account and income to about 900 miles of good single-track railroad, such as the Illinois Central and Chicago & Alton, and we may therefore put a mile of such railroad as equivalent to about 70 miles of telegraph line. The proportion of working expenses of 70 per cent. is a little greater than the average proportion on railroads, probably, which is about 66 per cent., so that this equation of 70 miles of telegraph = one mile of good railroad is not so far out of the way.

The division of working expenses is very different, however. The report shows only about 25 per cent. of the expenses to have been for maintenance and supplies, and nearly all of the other 75 per cent. must have been for services. At the close of the year the company was employing 9,190 persons of all grades; or about one to seven miles of line or 17 miles of wire.

The work done during the year consisted of the transmission of 14,456,832 messages, at an average rate of 61 cents, and an average profit of 19 cents, against 12,444,499 transmitted the previous year, the increase being 16.1 per cent.

A statement of income account for the term of seven years since the consolidation is given in the last report, in which the net earnings for that period are given as \$20,312,618.81, which is an average of \$2,941,139 per year, or about 6 per cent. more than for the last year of the series. Of these net earnings \$4,837,239.34 was distributed in dividends, and \$2,216,194.98 paid for interest on bonds. Of the balance, \$4,405,180.44 went for the construction of new lines and wires, \$7,441,251.92 for the purchase of stocks of telegraph companies (including \$4,051,483.07 for its own stock), \$974,075 in payment of bonds matured, \$318,263.14 for real estate. The income is thus seen to have been chiefly invested in additions to the company's property. But the exigencies of the situation seem to have been such as to necessitate such a reduction of rates that there has been no increase in net receipts. The mileage of wire has more than doubled in this seven years, and the number of messages nearly trebled; but the net income for the last year is seen to be considerably less than the average per year of the period.

#### Record of New Railroad Construction.

This number of the RAILROAD GAZETTE has information of the laying of track on new railroads as follows:

*Mercer & Somerset.*—Extended from Hopewell northeastward 7 miles to Haringen, N. J. *Utah Northern.*—Extended from Logan northward to Hyde Park, Utah. (The road is of 3-foot gauge.) *Wisconsin Central.*—Extended northward 6½ miles to Chelsea, Wis. *Mineral Range.*—This railroad of 3-foot gauge has been opened from Hancock to Calumet, Mich., 12½ miles.

This is a total of 30 miles of new railroad, which make a total of 2,897½ miles of new railroad completed in the United States in 1873.

RAILROADING IN TEXAS has, since the appearance of yellow fever in that State, been a work of no small difficulty and even danger. At the first rumor of fever in any town, all the surrounding towns and villages forthwith establish a quarantine against the suspected place; and when a conductor starts his train from a station he is by no means certain that at the next stopping place he may not be confronted by an armed posse, insisting upon his at once taking the train back to the place from which he came. Indeed, he may esteem himself fortunate if he escapes arrest and imprisonment; and if he displays an unaccommodating spirit or makes an attempt to run his train through, a charge of buckshot or a stray pistol bullet may fall to his lot. Seriously speaking, there has been a very general interruption of trade and travel on the Houston & Texas Central and International & Great Northern and to some extent on the Texas & Pacific also. There is, to say the least, a grave doubt as to the legality of these so-called quarantines, but thus far no steps seem to have been taken to test the question. In most cases they seem to be enforced in a somewhat rough and reckless fashion, and brute force instead of law is relied upon for the protection of communities against the pestilence. In some places the mail agents have endeavored to enforce at least the right of the mails to pass through the "quarantined" towns, but in the majority of instances even this has been prevented by an excited mob. The regular running of trains has been almost entirely suspended for days, in some cases for weeks, and when a train starts on its journey it is impossible to predict how far it will go, or when it will return. The effect of this has been an almost entire suspension of passenger travel; to the running of freight trains less objection is made, and there has been some degree of regularity in the movement of freight.

#### Trees for Station Grounds.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In answer to "R. L.'s" inquiry in your issue of October 11, I think maples should be mainly used, though water elm is a very hardy and, when trimmed and cared for, a quite pretty tree. The inclosure spoken of by him would look well with a row of elm and maple trees surrounding it, set alternately about 12 feet apart, the open space filled with a general mix-

ture of all kinds mentioned by him set as irregularly as may be, following nature as a guide. At all stations there should be from one to three or four acres set off (on one side at least and where convenient on both sides) of the passenger buildings, for the purpose of planting trees and fixing up generally. If properly managed, it costs but very little and makes such a decided improvement that it is money well invested. These are only my views. Let us hear some one else on the subject.

H—, October 18.

H. B.

#### The St. Louis Bridge an Obstruction to Navigation.

We give below the report of the board of engineer officers appointed, at the request of persons engaged in steamboat navigation on the Mississippi, to examine and report whether the Illinois & St. Louis Bridge, now nearly completed, would be a serious obstruction to navigation, and if so what measures should be taken to remedy the evil.

General A. A. Humphrey, Chief of Engineers, in submitting this report to the Secretary of War, under date of October 6, concurs in the views and recommendations of the board and recommends that they be submitted to Congress at its next session for such action as may seem to it proper. The Secretary of War approved the recommendation of General Humphrey October 10, and authorized him to forward to the Illinois & St. Louis Bridge Company a copy of the report and recommendations, which he did under date of October 15:

ENGINEER OFFICE, U. S. A.,

1,222 PINE STREET,

St. Louis, Mo., Sept. 11, 1873.

Brig.-Gen. A. A. Humphrey, Chief of Engineers, U. S. A., Washington, D. C.

GENERAL.—The board of engineer officers convened by Special Order No. 169, War Department, Adjutant-General's Office, Washington, August 20, 1873, "to examine the construction of the St. Louis & Illinois Bridge across the Mississippi River at St. Louis, and report whether the bridge will prove a serious obstruction to the navigation of said river; and, if so, in what manner its construction can be modified," have the honor to submit the following report:

In considering the subject laid before them, the board have confined themselves strictly to their instructions, which direct them to ascertain whether the bridge, as being built, will be a serious obstruction to the navigation of the Mississippi River, and, if so, what modification can be made in its construction.

They have not undertaken to decide whether the bridge is or is not being built in conformity to the acts of Congress authorizing its construction, although this question will be of importance when it becomes necessary to decide who shall pay for such modifications as may be determined on. The board have obtained from the steamboatmen who complain of the present structure a statement of their objections and the reasons therefor. They have obtained from the officers of the Bridge Company such drawings and statistics as were needed for a clear comprehension of the nature of the structure, and have caused a sufficient number of measurements to be taken to assure them that the drawings herewith submitted are substantially correct.

Appended to this report are the following documents and drawings:

- A. Copy of special orders convening the board.
- B and C. Copies of acts of Congress authorizing the construction of the bridge.
- D. Tracing giving profile of bridge and approaches. (Furnished by Bridge Company.)
- E. Tracing showing elevation of center and west spans of bridge, and portion of western approach. (Furnished by Bridge Company.)
- F. Tracing showing outline of the lower part of the superstructure as originally designed, and as now being constructed. (Furnished by Bridge Company.)
- G. Water record of the port of St. Louis for the last thirteen years, giving the duration of the various stages for each month of each year, and also some special observations taken previous to the continuous records. (Compiled by the board from the official records.)
- H. Tabular recapitulation of the above, giving the duration of the various stages for each year, the average yearly duration of each stage, with the corresponding heights under the center of the middle span, and the heights available for a width of 174 feet, or 87 feet on each side of the center of the arch.
- I. Drawing showing outline of center arch, with line of extreme high and low water, and also the widths of clear headway available at different heights above extreme low water. (Prepared by the board.)
- K. Tabular statement giving the most important dimensions of some of the principal steamboats plying to and from the port of St. Louis. (Furnished by the Boatmen's Association of St. Louis.)
- L. Diagram giving graphically the heights of chimneys and pilot-houses of steamboats enumerated in the following list, and showing the relative heights of the chord of the center arch, which is 174 feet long and five feet below the crown of the arch, for different stages, from extreme low water of 1863 to extreme high water of 1844. (Prepared by the board.)

These drawings and so forth presented the general features of the structure so clearly that a detailed description seems unnecessary.

The objections made to the bridge are as follows:

First. The height under the lower arch is so small that a large proportion of the boats which will have occasion to pass under it must lower their smoke-stacks at all, or nearly all, stages of the river, while many of the large boats will not be able to pass under it during the higher stages, even with their smoke-stacks down.

Second. The small height afforded is only available for a portion of the whole span, owing to the arch form of the lower part of the superstructure. Moreover, the difficulty of passing under the exact center of the arch will be very great, especially in foggy or windy weather, and any considerable deviation to either side may bring the boat's upper-works in contact with the bridge.

Third. These difficulties will probably deter most boats from ever passing the bridge, thereby preventing the ready transfer of freight from one boat to another, or its delivery and shipment at different parts of the city without resorting to costly transfer by drays or barges. This, it is claimed, will practically cut the Mississippi River in two at this place.

An examination of appendices K and L will show that the first point is well sustained. The list of boats enumerated therein comprises only those which happened to be in port at the time the board was in session, or whose dimensions were attainable. It might have been increased considerably had time been available. The apparently unmeasurable height and size of the chimneys in general use on these steamboats are really essential to secure a good draft to the furnaces, and economical combustion of fuel. Artificial means to procure the same end are generally very expensive and often ineffective. Although it is a comparatively easy task to lower small

chimneys, dealing with those of a large size is a very serious matter, indeed. Their weight is so utterly disproportionate to their strength, even when new, that no machinery yet devised will enable large chimneys to be lowered either wholly or in part without very great labor and danger. The elevated portion of the pilot-house is necessary to enable the pilot to have an unobstructed view of the river ahead and astern of his boat. Experience has decided this point most clearly.

The second objection is mainly owing to the peculiar system of superstructure employed, and which we understand was adopted principally on the ground of economy. Appendix I gives the widths which are available under the center span, above extreme low water. The side spans have not been considered, as they are four feet lower than the central one. Appendix F shows the lower line of the superstructure as originally designed, with the railroad tracks below the arch for a portion of the width 226 feet. By a subsequent modification the lower arch tube was lowered four feet at the crown, while the railroad tracks were raised through a similar distance. This brings the railway entirely above the arch, and increases the height of the center of the arch about four feet. The practical conditions are, however, but little altered by this modification. The full height is only given at the exact center of the arch, and in order to consider the matter in its practical bearing, it is necessary to assume that some definite width will be required for the safe passage of the boat.

The width of draw spans required by Congressional legislation up to this date varies from 160 to 200 feet. The former width would be too small for the large boats used on the Lower Mississippi, and an approximation to greater width would probably be necessary. The horizontal chord of the center span, which lies five feet below the crown of the arch, is 174 feet long, and gives the least width of waterway which seems compatible with safe navigation. The height of this chord is fifty feet above the city directrix. It may therefore be assumed that a boat, no portion of whose structure extended above this limiting height, might safely pass under the bridge, provided the pilot was enabled to keep her within the space mentioned, viz., eighty-seven feet on each side of the center of the span. The position of this chord, with reference to the different stages of water, is given in appendix L, which also shows the relative heights of the chimneys and pilot-houses of a large number of boats which will have to pass under the bridge when it is completed.

There remains still to be considered the practical difficulty of keeping a boat within the limited width necessary for safety. It is the opinion of the board that this will be a matter of very great uncertainty, and this is also the view taken by intelligent pilots who were questioned on this point. They maintained that the same width of waterway between piers with clear headway above would be far preferable. The reason given for this is that the piers would define the available width with exactness; they are easily seen and avoided. In case of wind a boat can be dropped through the opening by lines made fast to ringbolts in the pier itself. In case of striking them under the headway the damage done is to the hull alone, and even if so great as eventually to sink the boat, time will generally be afforded to save the crew and passengers.

In case of a wide arch, however, the case is different. The piers are too far apart to be of service as guides, and lights placed on the structure will be so nearly overhead as to be of no great assistance. If range lights could be placed at some distance above and below the bridge the difficulty might be mitigated, but in a crowded harbor like that of St. Louis it would be almost if not quite impossible to give the light sufficient individuality to avoid the chance of mistakes. Moreover, in foggy weather the lights could not be seen. In cases of wind there would be great danger of a boat sheering, or making so much leeway as to come in contact with the bridge. In this case the shock would come upon the light upper works, which would probably be destroyed. As the passengers are carried on the upper decks, such an accident would probably be attended with great loss of life.

The chance of dropping through along the pier is not available in this case, as the arch of the center span springs from a point about at the level of high water of 1844.

The third objection seems fairly sustained by the facts already cited, especially when it is remembered that the principal part of the river business is done during the higher stages of water. The large New Orleans boats, for instance, rarely attempt to do business when the river gets to a lower stage than twenty feet above extreme low water.

A large portion of the St. Louis river front is above the bridge, and several elevators, sugar refinery and other similar buildings are already located above it. These could not safely be reached by the large boats during the high stages and much inconvenience would be entailed. But the board consider these interests in a measure local, and of infinitely less importance than the national interests involved in the question. The government has expended and is still expending large sums of money in improving the navigation of the Upper Mississippi, Missouri, Illinois and other rivers, for the express purpose of allowing the largest steamers to navigate them. It would, therefore, seem entirely out of keeping with this general policy to allow, at the very threshold of these improvements, a structure which would debar a large proportion of existing steamboats from using them.

The board are therefore unanimously of the opinion that the bridge, as at present designed, will prove a very serious obstruction to the navigation of the Mississippi River.

They would moreover state that arch trusses, like those under construction, present so many difficulties to free navigation that in future their use should be prohibited in plans for bridges over navigable streams. The board have very carefully considered the various plans proposed for the changing the present structure, but found none of them satisfactory. The piers being only made strong enough to withstand the thrust of the unloaded arches, it will be impossible to raise separately either of the spans or to substitute for one of them a straight truss, or a suspended roadway. The practical difficulty of raising the entire structure would be very great, as well as enormously costly.

Moreover, in any such plan the present approaches, including the costly tunnel under a portion of the city of St. Louis, could not be used without considerable modification, as the steamboat men deem a clear height of seventy-five feet above high water the least admissible.

Under these circumstances, the board do not feel justified in recommending any change which would involve the complete remodeling of this magnificent structure, now so nearly completed. At the same time, as already stated, they deem it absolutely necessary that some provision should be made for allowing large boats to pass the bridge with safety whenever they find it necessary to do so.

They would therefore recommend, as the most feasible modification, a plan which has been already tried and found efficient at the railroad bridge over the Ohio River at Louisville, Ky.

Let a canal, or rather an open cut, be formed behind the east abutment of the bridge, giving at the abutment a clear width of waterway of 120 feet. The shore side of this cut should be laid out on an easy curve joining the general shore line about 500 feet above the bridge and 300 feet below it. The river side may be entirely open, but the shore side should be revetted vertically with stone or with crib-work to a height of about five feet above extreme high water. This wall should be provided with ring-bolts and posts to enable boats to work through the cut with lines. Let this opening be spanned by a draw-bridge, giving a clear span of 120 feet in width. By this plan boats as large as any now built would be able to get through the bridge



in any weather, at any stage of water, and only at the cost of some little delay.

The steamboat-men have stated to the board that they would be satisfied with this modification, and the engineers of the Bridge Company only raise as an objection the delay to trains caused by opening and shutting the draw. While recognizing the validity of this objection, the board deem that the difficulty can be mitigated, if not entirely overcome, by providing machinery capable of opening and closing the draw with any desired rapidity. They think, moreover, that it will only be in exceptional cases that boats will desire to pass through this draw, so the delay to trains from this cause will not be excessive.

Detailed estimates of the cost of this proposed modification can only be made after a specified survey and study of the locality. Owing to the pressure of their official duties, the board deem that it would be impossible for them to remain in session while these surveys and calculations are being made, and would, therefore, recommend that it be made a special duty of the local engineer officer to prepare and submit the estimate. Whether this modification be carried out or not, the board deem it very important that such lights and marks should be displayed by the bridge as will enable boats not only to distinguish the position of the piers and arches with certainty, but also be able to tell the clear headway available under the bridge.

The modification proposed by the board will not require the present work of constructing the bridge to be interrupted, and the only action which seems necessary is to submit this matter to Congress at its next session with a recommendation that action be taken to enforce the modification, and at the same time determine by whom it shall be carried out.

Respectfully submitted,

J. H. SIMPSON,  
Col. Engr's and Bvt. Brig. Gen. U. S. A.,  
G. K. WARREN,  
Maj. Engr's and Bvt. Maj. Gen. U. S. A.,  
G. WEITZEL,  
Maj. of Engr's and Bvt. Maj. Gen.,  
W. E. MERRILL,  
Maj. Engr's and Bvt. Col.,  
CHAS. R. SUTTER,  
Maj. of Engr's U. S. A.

#### The Transportation of Cattle.

The following is the text of the law relating to the transportation of cattle, which was passed at the last session of Congress, and went into effect October 1:

Be it enacted by the Senate and House of Representatives of the United States, in Congress assembled, That no railway within the United States, whose road forms any part of a line or road over which cattle, sheep, swine, or other animals shall be conveyed from one State to another, or the owners or masters of steam, sailing, or other vessels carrying or transporting cattle, sheep, swine, or other animals from one State to another, shall confine them in cars, boats, or vessels of any description for a longer period than twenty-eight consecutive hours without unloading the same for rest, water and feeding, for a period of at least five consecutive hours, unless prevented from so unloading by storm or accidental causes. In estimating such confinement the time during which the animals have been confined without such rest on connecting roads from which they are received shall be included, it being the intent of this act to prohibit their continuous confinement beyond the period of twenty-eight hours, except upon contingencies hereinbefore stated. Animals so unloaded shall be properly fed and watered during such rest by the owner or person having the custody thereof, or in case of his default in so doing then by the railway company, or owners or masters of boats or vessels transporting the same, at the expense of said owner or person in custody thereof; and said company, owners or masters shall in such case have a lien upon such animals for food, care and custody furnished, and shall not be liable for any detention of such animals authorized by this act. Any company, owner or custodian of such animals who shall knowingly and willfully fail to comply with the provisions of this act shall, for each and every such failure to comply with the provisions of this act, be liable for, and forfeit and pay, a penalty of not less than \$100 nor more than \$500; Provided, however, That when animals shall be carried in cars, boats or other vessels in which they can and do have proper food, space and opportunity for rest, the foregoing provisions in regard to their being unloaded shall not apply.

Sec. 2. That the penalty created by the first section of this act shall be recovered by civil action, in the name of the United States, in the Circuit or District Court of the United States holden within the district where the violation of this act may have been committed, or the person or corporation resides or carries on its business; and it shall be the duty of all the United States Marshals, their deputies or subordinates, to prosecute all violations of this act which shall come to their notice or knowledge.

Sec. 3. That any person or corporation entitled to lien under the first section of this act may enforce the same by a petition filed in the District Court of the United States holden within the district where food, care and custody shall have been furnished, or the owner or the custodian of the property resides; and said court shall have power to issue all suitable process for the enforcement of such lien by sale or otherwise, and to compel the payment of all costs, penalties, charges and expenses of proceedings under this act.

Sec. 4. That this act shall not go into effect until the 1st day of October, 1873.

#### CHICAGO RAILROAD NEWS.

##### Ticket Agents' Commissions.

The movement in favor of the abandonment of the policy of paying commissions for the sale of tickets is popular with the general ticket agents and promises to result in something. The matter now rests with the general managers of the several roads; and a meeting has been called for November 19, in this city, to settle what policy shall in future be adopted in regard to the matter. The public look with interest upon the suggested reform, since these commissions are regarded as wholly unnecessary expenses on the part of railroad companies, the whole amount of which is assessed upon the passenger public.

##### Stock Passes.

The new stock passes over the roads centering in this city having been abused to some extent, the General Freight Agent of the Chicago, Rock Island & Pacific road has issued an order prohibiting the transportation free of any persons except the owners of stock or their employees.

##### Illinois Central.

Considerable improvements are to be made at Cairo, Ill. The freight yard is to be enlarged and several new side tracks laid down, the local freight house improved, and a new approach made to the yard for teams.

##### Revival of Business.

Considering the times, the railroad companies, perhaps, have as small ground of complaint as anybody. The business since October 1 compares favorably with the corresponding period

last year. On the Chicago, Burlington & Quincy Railroad the receipts for passengers for the first week in October, this year, were \$80,325, against \$74,355 for the corresponding week last year. The Illinois Central road reports business for the past week to be equally good with that of the same period a year ago. The live stock transportation business is small, comparatively, on account of the low price which is paid for it, and grain shipments eastward by rail are very small, owing to the low lake freights at the present time.

##### Chicago & Alton.

This company is pushing forward its double track as rapidly as possible. It will be finished this week to Summit, and is to be done as far as Joliet by the advent of winter, which is pretty strong evidence that the company intends to have the second track completed to Wilmington next season.

##### Chicago, Rock Island & Pacific.

The new freight depot at Rock Island, Ill., has been completed and workmen have commenced to pull down the old building. This was built in January, 1854, and was the first railroad depot built on the banks of the upper Mississippi.

### General Railroad News.

#### ELECTIONS AND APPOINTMENTS.

Hon. Oden Bowie has been elected President of the Baltimore City Passenger Railway Company in place of Mr. Henry Tyson, now Fourth Vice-President of the Erie Railway Company.

At the annual meeting of the St. Joseph & Denver City Railroad Company in St. Joseph, Mo., October 14, the following directors were chosen: William Bond, Lawrence Wells, José F. Navarro, H. A. Johnson, George J. Forrest, Thomas U. Smith, Henry H. Butterworth, Henry C. Tanner, Robert W. Dunnell, New York; Edward W. Mealy, Hagerstown, Md.; D. M. Steele, St. Joseph, Mo.; E. N. Morrill, Hiawatha, Kan.; John Saxon, Fairbury, Neb. Nearly all the directors who came into the Board a short time since are re-elected.

Mr. Hugh Spencer, late of the Prairie du Chien Division of the Milwaukee & St. Paul, has been appointed Train Dispatcher at Hudson, Wis., on the West Wisconsin road.

Mr. W. J. Edgar, late Train Dispatcher on the Chicago, Burlington & Quincy, has been appointed Chief Operator on the Burlington & Missouri River road, in place of N. D. Root, who has resigned to accept a position on the St. Louis, Kansas City & Northern road.

At the annual meeting of the Cumberland & Pennsylvania Railroad Company, in Cumberland, Md., October 13, the old board of directors was re-elected as follows: William H. Aspinwall, Warren Delano, Henry A. Mott, Adam Norrie, William Whitewright, Jr., all of New York. At the meeting 14,000 shares were voted on.

At the annual meeting of the Western Maryland Railroad Company in Baltimore, October 15, the following directors were re-elected for the ensuing year: John K. Longwell, Westminster, Md.; John Biggs, Rocky Ridge, Md.; John Weitz, Smithsburg, Md.; George W. Harris, Hagerstown, Md.; Isaac Motter, Williamsport, Md.

At the annual meeting of the Annapolis & Elk Ridge Railroad Company, in Annapolis, Md., October 13, the following board of directors was elected for the ensuing year: George H. Steuart, Baltimore; Z. G. Butler, Annapolis, Md.; Thomas S. Iglehart, D. B. Magruder, Anne Arundel County, Md.; William R. Hutton, J. P. Solomon, Calvert County, Md.; J. F. Bareda, New York. Three additional directors are appointed by the State of Maryland.

Mr. Henry Deitz has been appointed Local Treasurer and Auditor of the California & Texas Railway Construction Company for the Sherman Division of the Texas & Pacific Railway. His office is at Sherman, Tex. Mr. Deitz was formerly General Purchaser and Supply Agent of the Atchison & Nebraska Railroad at Atchison, Kan., and later Confidential Clerk to Colonel Eddy, Assistant Superintendent of the California & Texas Construction Company.

At the annual meeting of the Ohio & Mississippi Railway Company in Cincinnati, October 9, the following directors were elected: W. W. Scarborough, Larz Anderson, James D. Lehmer, Cincinnati; A. N. Chrystie, Lewis B. Parsons, St. Louis; John King, Jr., Baltimore; W. H. Aspinwall, Allan Campbell, W. T. McClintock, Samuel W. F. Odell, Frederick Schuchardt, Daniel Torrance, William Whitewright, Jr., New York. The only change in the board is the election of Mr. McClintock in place of Joseph W. Alsop, resigned.

At the annual meeting of the Danvers Railroad Company in Boston, October 16, the following directors were elected: N. G. White, Lawrence, Mass.; E. J. M. Hale, Haverhill, Mass.; Amos Paul, South Newmarket, N. H.; John E. Bickford, Dover, N. H.; C. Wakefield, Wakefield, Mass.; George C. Lord, N. J. Bradlee, Boston. These are all directors of the Boston & Maine Company, which leases the road.

At the annual meeting of the Newburyport Railroad Company in Boston, Mass., October 16, the following directors were elected: G. C. Lord, N. J. Bradlee, Boston; C. Wakefield, Wakefield, Mass.; E. J. M. Hale, Haverhill, Mass.; N. G. White, Lawrence, Mass.; John E. Bickford, Dover, N. H.; Amos Paul, South Newmarket, N. H. These are all directors of the Boston & Maine Company, which leases the road.

It is reported that Mr. George C. Kimball, late Superintendent of the Flint & Pere Marquette Railroad, has been offered the position of Superintendent of the Detroit & Bay City and Jackson, Lansing & Saginaw railroads. Mr. Kimball has not either accepted or declined the position.

Mr. W. F. Durfee, of Philadelphia, has been appointed Superintendent of the Milwaukee Iron Company. Mr. J. J. Hagerman, heretofore Secretary and Superintendent, will hereafter be Secretary only.

The Western Illinois Bridge Company, formed by the consolidation of the Illinois and Missouri companies of the same name, has been organized by the election of the following officers: President, J. K. Van Doorn; Secretary, Charles H. Morton; Treasurer, Samuel Wood; Chief Engineer, Major Petrie; General Superintendent, Captain M. Piggott. The address of the company is at Quincy, Ill.

At the annual meeting of the Wolfborough Railroad Company at Wolfborough, N. H., October 15, the following board of directors was chosen: J. M. Brackett, Joseph L. Avery, Blake Folsom, Wolfborough, N. H.; George W. Burleigh, Great Falls, N. H.; J. W. Sanborn, Wakefield, N. H.; Thornton K. Lathrop, B. K. Reed, Boston. Thornton K. Lathrop was chosen President, and John L. Peary, Wolfborough, N. H., Clerk. The road is a branch of the Portsmouth, Great Falls & Conway, and is leased by the Eastern Railway Company.

The directors of the newly organized St. Louis & St. Charles Railroad Company have chosen the following officers: President, John L. Ferguson; Vice-President, John H. Torrey; Secretary, William H. Thornburg; Treasurer, James Miller. The address of the company is St. Louis, Mo.

Mr. D. Waterman has been appointed Auditor of the Detroit & Bay City Railroad, with office at Detroit, Mich. Mr. Waterman has been connected with the Lake Shore & Michi-

gan Southern, the Atlantic & Pacific, and more recently with the St. Louis & Iron Mountain road.

Mr. L. W. Palmer, late Assistant Superintendent, has been appointed Superintendent of the Cairo & Vincennes Railroad, in place of Roswell Miller, resigned. Mr. Miller was appointed Superintendent a few weeks since by General Burnside, President of the road, and his appointment was only intended to be temporary. Mr. B. F. Burnside has been appointed Assistant Superintendent.

At the annual meeting of the Maxwell Land Grant & Railway Company in Cimarron, New Mexico, October 10, S. B. Elkins, W. R. Morley, T. B. Catron, H. M. Porter and R. H. Longwill were chosen directors. Mr. Catron is the only new director, taking the place of Mr. A. J. B. Mainway, of Rotterdam, Holland. The Board re-elected S. B. Elkins, President, W. R. Morley, Vice-President and Executive Officer and Harry Whigham, Secretary and Treasurer pro tem.

At the annual meeting of the New Jersey Southern Railroad Company, October 14, the following board of directors was elected: E. F. Stockton, Trenton, N. J.; Benjamin Williamson, Elizabeth, N. J.; John Torrey, Jr., Toms River, N. J.; Ashbel Green, S. W. Mills, C. W. Huntington, J. B. Norris, H. H. Cook, C. J. Osborn, E. G. Eldredge, F. P. Shaw, G. A. Morosini and W. A. Painter, New York. Messrs. Mills, Huntington, Cook, Eldredge, Shaw and Painter are new directors. Mr. M. W. Serat, late Superintendent of the road, was chosen President in place of Jay Gould.

Mr. George C. Hopper, late Assistant Superintendent of the Jackson, Lansing & Saginaw Division of the Michigan Central Railroad, has been appointed General Paymaster of the Michigan Central road and its branches. C. B. Bush, former Superintendent of the Grand River Valley Division of the Michigan Central road succeeds Mr. Hopper in the Jackson, Lansing & Saginaw Division.

An order from the President of the St. Louis & Southeastern Railway Company announces the following changes, which took effect October 18:

Mr. H. L. Morrill having resigned as Superintendent of the Nashville Division, the organization is changed as follows:

Mr. A. E. Shrader, General Freight Agent, is appointed General Superintendent of the road, and will continue in charge of the freight department.

Mr. George S. Winslow is relieved from duty as Division Superintendent of the St. Louis Division, and appointed Assistant General Superintendent.

Mr. J. F. Alexander is announced as Treasurer of the company, having been duly elected to that position.

Mr. Charles W. Gardner, Secretary of the company, is appointed Purchasing Agent.

At a meeting of the Baltimore City Council held October 20, the following gentlemen were nominated by the Mayor and confirmed by the Council as directors of the Western Maryland Railroad Company on behalf of the city: James L. McLane, Alexander Riemann, E. G. Hipsley, Samuel H. Taggart, Decatur H. Miller, Samuel H. Adams, William A. Boyd, Jr., and George M. Booke, all of Baltimore.

The Toledo & Maumee (narrow gauge) Railroad Company has been organized by the election of the following directors: H. S. Walbridge, W. J. Wells, G. Vogel, Toledo, O.; G. W. Reynolds, J. McDonald, Maumee, O.; C. C. Keyser, J. Geiger, Miami, O. The directors elected officers as follows: President, W. J. Wells; Vice-President, G. W. Reynolds; Secretary, M. W. Plain; Treasurer, H. S. Walbridge.

#### PERSONAL.

Jay Gould has resigned his position as President of the New Jersey Southern Railroad, and will, it is reported, leave New York and probably the country for a term of years.

Messrs. John Walker, Vice-President, E. W. Hyman, Treasurer, and Edward Harris and Robert Reid, directors, of the London, Huron & Bruce Railway Company have resigned their respective positions, in consequence of differences of opinion in the board of directors.

Mr. Delos E. Culver, of Jersey City, N. J., a banker and railroad contractor and Vice-President of the New York & Oswego Midland Company, has been adjudged a bankrupt. His liabilities are reported at \$3,000,000, and it is said a large part of them are the result of operations in connection with the Midland.

Mr. Oliver G. Bartlett, Foreman of the Locomotive Department of the Michigan Central at Detroit, was recently presented with a handsome silver set by the employees of the department.

Mr. H. H. Smith, Assistant Superintendent of the Detroit, Lansing & Lake Michigan road, was married to Miss Emma Gould at Muir, Mich., October 8.

Gen. T. S. Rosser, Chief Assistant Engineer of the Northern Pacific Railroad, has resigned his position. General Rosser has had immediate charge of the surveys and engineering work on the road.

#### TRAFFIC AND EARNINGS.

The receipts of the Rockford, Rock Island & St. Louis Railroad Company for the year ending June 30, 1873, were:

Passengers.....	\$230,311 81
Freight.....	693,505 61
Mails, express, etc.....	54,832 86

Total (\$3,385 per mile).....\$947,650 28

Working expenses.....\$655,423 36

Taxes, insurance and rents.....112,893 31

Net earnings (\$640 per mile).....\$179,331 41

During this time there was \$84,001.24 expended for construction. The net earnings are a trifle less than 2 per cent. on the bonded debt.

The earnings of the Chesapeake & Ohio Railroad for July were \$123,375; for August, \$152,047; for September, \$176,751; total for three months, \$452,173.

The earnings of the Great Western Railway of Canada for the week ending September 26 were: 1873, \$34,660; 1872, \$30,968; increase, \$3,692, or 11 1/2 per cent.

The earnings of the Grand Trunk Railway of Canada for the week ending September 27 were: 1873, \$34,200; 1872, \$42,100; decrease, \$7,900, or 18 1/2 per cent.

The revenue of the Chesapeake & Ohio Canal for the month of September was: 1873, \$68,276.26; 1872, \$56,873.42; increase, \$11,402.84, or 20 per cent. The ordinary expenses for maintaining and operating the canal during the month were \$18,857.29; net earnings for the month, \$49,418.97. The coal tonnage of the canal for the month was 106,525 tons, an increase over last year of 15,961 tons, or 17 1/2 per cent.

The earnings of the Erie Railway for the first week in October were: 1873, \$429,481; 1872, \$403,850; increase, \$25,622, or 6 1/2 per cent.

The earnings of the Denver & Rio Grande Railway for the first week in October were: passengers, \$3,865.05; freight, \$4,112.16; mails, \$123; express and miscellaneous, \$112.45; total, \$7,712.66; 1872, total, \$7,124.01; increase, \$588.65, or 8 1/2 per cent. For the week in 1873, \$123 was for transportation of



troops, mails and government freight. In 1872 the earnings included \$1,752.05 for contractors' freight.

—The earnings of the St. Louis, Kansas City & Northern Railway for the second week in October were: 1873, \$79,708; 1872, \$80,506; decrease, \$798, or 1 per cent.

—During the month of September the Utah Central road carried 14,201 tons of freight. The principal items were: Coal, 3,705 tons; coke, 632 tons; charcoal, 1,063 tons; ore, 901 tons; iron ore, 613 tons; base bullion, 1,320 tons; railroad material, 1,701 tons; lumber, 1,011 tons.

—The whole amount of freight carried over the Utah Southern road during the month of September was 9,493 tons. The principal items were: Coal, 825 tons; coke, 632 tons; charcoal, 1,088 tons; ore, 1,330 tons; base bullion, 1,259 tons; iron ore, 1,087 tons; railroad material, 1,205 tons.

—The earnings of the St. Louis & Southeastern Railway for the first week in October were: 1873, St. Louis Division, \$21,959.97; Nashville Division, \$9,433.79; total, \$31,393.76; 1872, total, \$28,634.65; increase, \$2,759.11, or 9½ per cent.

—The earnings of the Indianapolis, Bloomington & Western Railway for the first two weeks in October were: 1873, \$88,348; 1872, \$65,613; increase, \$12,735, or 27 per cent.

—The earnings of the Chicago, Danville & Vincennes Railroad for the second week in October were: 1873, \$17,687; 1872, \$13,122; increase, \$4,565, or 34½ per cent.

### THE SCRAP HEAP.

#### Diplomas of Honor at Vienna Awarded to British Exhibitors.

Among those awarded diplomas of honor for machinery, etc., at the Vienna Exhibition were Sir W. G. Armstrong & Co., in the art of war; Bessemer Steel and Ordnance Company, in metal industry; Broughton Copper Company, in metal industry; John Brown & Co., in metal industry; Charles Connell & Co., in metal industry; Combe & Barer, Belfast, in general machinery; Elkington & Co., Birmingham, in metal industry; W. & J. Galloway & Sons, Manchester, in general machinery; J. & F. Howard, Bedford, in agricultural machinery. The only diploma of honor for similar objects which went to America was that received by Wm. Sellers & Co., for machine tools, our exhibition of such articles being comparatively slight.

#### Telegraphic Time Signals.

A Chicago dispatch says that the experiment made on the lines of the Pennsylvania Company from Pittsburgh to Erie, Cleveland, Cincinnati, Chicago and Indianapolis, of telegraphic time signals, has worked so well in the running of trains that it has been determined to continue the system permanently. The experiments were made under the supervision of Mr. O. H. Booth, Superintendent of Telegraphs. The time used on all the lines is Columbus (O.) time, and is regulated each day by the astronomical clock at the Allegheny Observatory.

#### Railroad Manufactures.

The Taunton Locomotive Works recently shipped four 26-ton locomotives to Montevideo, South America, for the Maronias, Pando & Montevideo Railway. The engines have cylinders 14 by 22 inches with driving wheels five feet in diameter and are very highly finished.

Mr. S. W. Kemmer, formerly Superintendent of the Atlantic Car Works at Salem, Mass., is now at Detroit, Mich., superintending the construction of a number of his patent compartment stock cars. These cars are 36 feet long and are divided into four compartments holding four cattle each. The cattle can be provided with food and water by levers operated from the top of the car. Ten of these cars will be completed shortly.

The Danforth Locomotive Works, at Paterson, N. J., have retained their full force of employees, and are running seven hours per day. This course is preferred to discharging any of their men.

The Atlantic Car Company at Salem, Mass., has just filled a large order for the New York Central & Hudson River road. The company is building 12 passenger coaches for the Boston & Maine and 15 for the Eastern road, besides 250 coal cars for the Boston, Clinton & Fitchburg.

The new rolling mill of the Bay State Iron Works at South Boston, Mass., will be ready to put in operation early in November. It is to be used for the manufacture of plate iron. The main building is 240 feet long and 141 feet wide, and has an L 70 by 30 feet. The mill has six heating furnaces with boilers, the stacks of which are of iron lined up with fire-brick. There will be two trains of rolls, each 9 feet long and 30 inches in diameter. The works will be driven by a condensing engine of 1,000 horsepower, the cylinder of which is 40 inches in diameter; stroke 6 feet. The two fly-wheels are 24 feet in diameter and weigh 53 tons each.

#### Premiums to Track Foremen.

In March last the St. Louis, Vandalia, Terre Haute & Indianapolis Company, following the example of the Philadelphia & Erie, issued an order offering premiums to those section foremen on each of the three divisions of the road who could show the best piece of track at the end of the summer. Recently, after a careful inspection, the premiums were awarded as follows:

First Division (East St. Louis to Effingham)—the first premium of \$100 to A. Whalen, Section No. 14, and the second premium of \$50 to William Collins, Section No. 7.

Second Division (Terre Haute to Indianapolis)—first premium of \$100 to C. D. Spotts, Section No. 21, and the second premium of \$50 to E. Dermody, Section No. 25.

Third Division (Terre Haute to Indianapolis)—first premium of \$100 to C. Harrington, Section No. 36, and second premium of \$50 to C. Eaglesfield, Section No. 39.

A number of sections were in excellent order, showing careful work and making it difficult for the judges to decide. The officers of the road were much pleased with the result, and it is understood that similar premiums will be offered next year.

#### Preserving Wood.

The Portland (Me.) State of October 4 says:

"We have been interested for some time in all inquiries concerning the matter of preserving wood by the various processes known to the country. Seeing the Spring street horse-car track up this week, we made an examination of the timbers used in laying it ten years ago this month. Mr. Gerrish, the builder of the track, says the spruce upon which the rails were laid was furnished from the Burnetizing Works at Bangor, and cost, he thinks, \$26 per thousand. This timber is entirely sound to-day, and is to be relied upon when the sewer is completed, without the displacement of any portion of it, which certainly is a fine showing, demonstrating as it does the undoubted value of this process when faithfully applied."

#### Goodwin's Improvement in Bridges.

Mr. John M. Goodwin, C. E., now of Cleveland, O. (No. 89 Public square, office of Cleveland & Mahoning Railway), has received a patent, which is described as follows in the specifications:

"The object of my said invention is to relieve the principal girders, chords, side or middle trusses or beams of bridges, and girders, beams or trusses used in structures other than bridges, of the action and effect of loads moving along or over them, technically known as 'rolling loads,' and to cause the

stress of any load passing along or over, or distributed unequally upon, any bridge or structure in which said invention or device is used, to act always in a direction nearly absolutely vertical, and practically vertical, upon one certain surface, and at the same time to cause the stress of such rolling loads to be brought upon such surface or surfaces by a gradual accumulation, the stress upon such surface or surfaces of the principal girder or girders acting at all times in a direction practically vertical, as aforesaid, and with a force always in proportion to the distance from the ends of the bridge at which any load upon the supplementary girders aforesaid may be (the said load being in this connection considered as passing from end to toward center, the force only, and not the character, of such stress being changed by the changing of the position of the load), thereby removing from the principal girder or girders those undulatory and otherwise disintegrating disturbances of fibre which are produced by the direct action of rolling loads; and also to cause the stress of any unequally-distributed load to be transmitted to the principal girder or girders aforesaid through the surface or surfaces, and in the direction, nearly and practically vertical, heretofore specified."

### OLD AND NEW ROADS.

#### Rabun Gap Short Line.

Meetings are being held in Macon County, N. C., in aid of the building of this road, which is to constitute a section of the projected Chicago & South Atlantic line. Committees have been appointed and subscriptions made payable in money, land and labor. The line is the same as that selected for the Blue Ridge Railroad many years ago.

#### Pennsylvania & Western.

This company, which talks of building a new railroad from New York to Cleveland, O., with a branch to Pittsburgh, claims to have found a nearly direct line by which the Allegheny Mountains can be crossed with a maximum grade of 66 feet to the mile. The company is now holding meetings and endeavoring to secure subscriptions along the proposed line of the road in Central Pennsylvania.

#### Gilman, Clinton & Springfield.

In a suit by certain stockholders against the directors of this company, in which corrupt contracts were charged with the Morgan Improvement Company and the Barclay Coal Company, in which these directors were interested, the contract with the Barclay Coal Company was produced. The following is a synopsis of it:

The contract was made August 20, 1872, between the coal mining company and the Gilman, Clinton & Springfield Railway, to run twenty-five years. The coal company was to furnish the railroad all the coal required by it for all purposes at fifty cents above what they pay for mining per ton, and the railroad is to furnish all the cars necessary to work the mine to its full capacity, and furnish men to load the engines from the shutes; to transport over its line any coal shipped by the Barclay Company at ten per cent. lower rate than for any other shipper, and for all coal shipped to Mount Pulaski, Clinton, Farmer City, Gibson, Gilman, or any other point where other roads cross, creating competition, to allow the Barclay Company a rebate of \$1.50 per car in addition to the ten per cent. reduction. The railroad agrees to fix rates along the line at \$2.50 per car for the Barclay Company less than the regular rates east of Springfield, and collect there the deductions from the consignee—the ten per cent. reduction and the \$1.50 rebate—and return the same to the coal company monthly, this agreement to take effect upon the completion of the mine, and to be in force twenty-five years. The foregoing contract was made between the directors of said road, Melvin, Williams and Black, and the coal company, the former three being sole proprietors of the coal company, and was ratified by their vote. This action they justify in their answers, and claim the same as neither illegal nor fraudulent, but that such contracts are common with many railroads in Illinois.

#### European & North America.

It is reported that the arrangements for the consolidation with the Maine Central and the change of gauge from 5 feet 6 inches to 4 feet 8½ inches has been postponed until next spring. Work on the standard gauge cars has been stopped for the present.

#### European Prices of American Bonds.

The quotations in Frankfurt, September 26, when our panic had probably had its full effect, were as follows: Brunswick & Albany 6s (guaranteed by State of Georgia), 12½; Buffalo, New York & Philadelphia first mortgage 7s, 59½; Cairo & Vincennes 7s, 63½; California Pacific 7s, 59½; California & Oregon 6s, 64½; Central Pacific first mortgage 6s, 78½; San Joaquin Valley 6s, 62½; Chicago, Burlington & Quincy 4½s, 69½; Grand Rapids & Indiana 7s, 90; Kansas Pacific 7s, 70½; Lexington & St. Louis 6s, 49½; Mobile & Ohio 7s, 81; Oregon & California 7s, 15½; Rockford, Rock Island & St. Louis 3½s, 25; St. Louis & Southeastern 7s, 62; Union Pacific, Eastern Division, 6s, 60½; Union Pacific Omaha Bridge 6s, 85½. At Berlin, September 26 the following quotations were made: Alabama & Chattanooga 8s, 28½; California Extension, 5s; Chicago & Southwestern 7s, 66½; Fort Wayne, Muncie & Cincinnati, 2½; Peninsula of Michigan, 30; Port Royal, 42. And at Amsterdam on the 25th, Chicago & Northwestern (Madison Extension), 76½; do., Menomonee Extension, 76½; Winona & St. Peter 7s, 75½; St. Paul & Pacific, 2d section, 23½; do., of 1869, 25½; do., St. Vincent and Brainerd extensions 7s, 23½; Marietta & Pittsburgh 7s, 55; Atlantic, Mississippi & Ohio 7s, 51½; Atchison Branch 7s, 22; Cairo & St. Louis, 71.

Frankfort quotations, October 4, were as follows: United States 5-20s, of 1867, 100½; Brunswick & Albany 6s, 13½; Buffalo, New York & Philadelphia 7s, 58; Cairo & Vincennes 7s, 65½; California & Oregon 6s, 64½; Central Pacific, first mortgage, 6s, 80½; Chicago & Southwestern 7s, 68½; Grand Rapids & Indiana 7s, 90½; Kansas Pacific 7s, 70½; Missouri Pacific 6s, 67½; South Pacific 6s, 58½; Mobile & Ohio 7s, 83½; New York & Oswego Midland, first mortgage, 7s, 57; Oregon & California 7s, 19; Peninsula & Michigan, 7s, 31½; Rockford, Rock Island & St. Louis 3½s, 23½; Union Pacific, Eastern Division, 6s, 61½; Omaha Bridge 8s, 85½. October 3, Berlin quotations were: Alabama & Chattanooga 8s, 32; Port Royal 7s, 40½; St. Louis & Southeastern 7s, 54. Amsterdam quotations on the 2d were: Chicago & Northwestern (Madison extension) 7s, 79½; Chicago & Northwestern (Menomonee extension) 7s, 79½; Winona & St. Peter 7s, 79½; Union Pacific 6s, 65; Southern Branch Union Pacific 6s, 64½; St. Paul & Pacific 7s, (issue of 1869) 24½; St. Paul & Pacific 7s, (Vincent and Brainerd extensions) 22½; Marietta & Pittsburgh 7s, 56½; Atlantic, Mississippi & Ohio 7s, 49½; Atchison Branch 7s, 24½; Missouri, Kansas & Texas 7s, 64½; Cairo & St. Louis 7s, 70.

#### Pennsylvania—New York Division.

Work is proceeding steadily on the new cut through Bergen Hill for the freight line to Harsimus Cove. This cut enters the hill about an eighth of a mile above the present one and runs in a straight line to the present cut near the Summit bridge. The work requires a rock-cutting 1,300 feet long and in some places nearly 60 feet deep. The contractor, Mr. W. J. Nead, has four Ingersoll drills at work, and the holes drilled are three inches in diameter and 20 feet deep. Very large charges of powder are used, and in some cases 600 tons of rock have been loosened by one

blast. The rock is a very hard trap rock, and is being used for paving-blocks, a large number of which are supplied to contractors by Mr. Nead. As soon as this cut is completed, work will be commenced on the widening of the old cut from Marion eastward, so as to admit of the laying of additional tracks through it. Two additional tracks are to be laid to the junction with the new cut, and probably one of these additional tracks will be continued to meet the third track, now laid for some distance from the eastern end.

#### Mineral Range.

Trains are now running on this narrow-gauge road from Hancock, Mich., to Calumet, 12½ miles.

#### Philadelphia & Erie.

The offices of Mr. William A. Baldwin, General Superintendent, and Theodore N. Ely, Superintendent of Motive Power and Machinery, have been removed from Erie, Pa., to Williamsport. Handsome and convenient rooms for the offices have been fitted up in the latter place. The change is made on account of the addition of the Susquehanna and Shamokin divisions of the Northern Central to the Philadelphia & Erie, Williamsport now being a central point on the road.

The railroad committee of the Philadelphia Common Council has held a number of meetings to examine into the reasons for the non-payment of dividends on the stock, of which the city of Philadelphia is a large holder. Complaints have been made by the committee of the difficulty of obtaining information from the company.

It is asserted that a report has been prepared which contains allegations of extensive frauds in the management of the road, especially in the matter of repairs to rolling stock. It is also asserted that efforts have been made to suppress this report and keep it from being submitted to the City Council.

#### New York & Oswego Midland.

The bridge over the Pequannock River, near Stockholm, N. J., was destroyed October 21, having fallen under a train in consequence of the weakening of the abutments by a freshet. The bridge will require a week to rebuild. Meanwhile all trains leave the Midland at Franklin, and run thence to Waterloo over the Sussex Railroad, and thence over the Morris & Essex Division of the Delaware, Lackawanna & Western and the Boonton Branch to Mountain View, where they pass to the Montclair Division of the Midland.

#### Cairo & St. Louis.

In the case of the Cairo & St. Louis Company against the County Court of Randolph County, Ill., an application for an injunction was filed in the Circuit Court last spring to restrain the County Court from issuing \$100,000 of bonds to the company in payment of a subscription made by the county. The company filed a demurrer which was sustained by the Circuit Court. The case was carried up on appeal, and the Illinois Supreme Court has just set the demurrer aside and sent the case back to the Circuit to be tried on its merits at the next term.

#### Kansas Pacific.

A new bridge is being built over the Kaw River at Kansas City. The bridge will be 552 feet long, and will have three spans of 180 feet each. The piers and abutments are to be of stone on pile foundations, and the superstructure will be a composite truss with top chord and struts of wood. The west abutment is nearly finished and the foundation for the first pier is laid.

#### Kansas City, St. Louis & Council Bluffs.

Negotiations are pending for the extension of this road into Leavenworth, Kan. Surveys and estimates have been made but no final decision has been reached. The Leavenworth Bridge Company has agreed to give the use of the bridge on the same terms as are granted to the Chicago, Rock Island & Pacific, and the Missouri Pacific Company has agreed to rent the use of its track on the Leavenworth side of the river on very favorable terms.

#### Detroit & Bay City.

Final arrangements have been made for the running of the passenger trains on the Jackson, Lansing & Saginaw to and from the Detroit & Bay City depot in Bay City, Mich. All passenger trains north and south will be made up in Bay City, and freight cars to and from Detroit will be run through on the Detroit & Bay City. Arrangements have also been made by which the Shore Line of steamers will run in connection with the Detroit & Bay City.

#### Subscriptions to Stock of New Companies.

In a case where a party had been one of the original associates in the formation of a railroad company, and had signed a subscription agreeing to take a certain number of shares in the proposed company, but afterward failed for some reason to sign the articles of incorporation or to subscribe for stock on the commissioners' books, the Supreme Court of Michigan lately held that the original subscription was valid, notwithstanding the subsequent failure to renew the subscription, and that the company could call in assessments on the subscription and sue for the amount of such assessments.

#### Fox River Improvement.

On the improvement of this river 200 men are now at work near Appleton, Wis., rebuilding the large dam at the head of the island. The rapids above Appleton are being dredged out to a depth of six feet. At the Cedars, between Appleton and Kaukauna, the locks are being repaired and placed in good condition. At Kaukauna a considerable force is at work quarrying stone. It is expected that by the middle of November the river from Menasha to Green Bay will be open for the passage of boats 135 feet long and drawing six feet of water. But little work is being done on the Upper Fox from Oshkosh to Portage.

#### Southern Pacific, of California.

Work is being pushed forward on the section of the road in Los Angeles County, Cal. The agreement under which the county voted its bonds and its stock in the Los Angeles, & San Pedro Company to the Southern Pacific required that 50 miles of road should be completed in the county by February, 1874. This 50 miles is being built in two sections, which will, for the present, form branches of the Los Angeles & San Pedro. The contract also requires that the railroad connection between Los Angeles and San Francisco shall be completed by November, 1877.

#### Illinois & St. Louis Bridge.

The St. Louis Republican of October 19 says:

"During the past week 79 tubes were put in position, making 612 in all which are in place. As the whole number to be contained in the structure is 1,012, only 400 are now remaining. Yesterday the two outer ribs of the first span were completed, with the exception of placing the connecting tube in each of the four strands. They are ready to be put in, and the couplings are fitted and lying on the bridge beneath. Early to-morrow morning they will be put in place and keyed up, and the first span will be an accomplished fact. As soon as that is done there will be no further use for the heavy wooden scaffolding now encumbering the span, and it will be removed as speedily as possible, thus affording a view of the finished structure in its graceful outlines and proportions. On the west side of the east pier six lengths of tubes have been placed, and the same on the east side. On the east abutment, the arch has been built out seven lengths, or a distance of eighty-four feet. It looks now as if the promise of the contractors to



have the spans entirely completed by the first of January will be carried out, and a little time to spare."

The tunnel which forms a part of the western approach is making rapid progress. The excavations are nearly completed, and the arching proceeds at the rate of nearly 400 feet per week.

#### Concord & Claremont.

The stockholders of the Concord & Claremont, the Sugar River and the Contoocook River railroad companies have unanimously voted to consolidate the three companies into one corporation under the name of the Concord & Claremont Railroad Company. The roads belonging to the consolidated company form a line from Concord, N. H., west by north to Claremont Junction on the Sullivan Railroad, 56½ miles, with a branch 15 miles long from Contoocook southwest to Hillsboro Bridge, 7¼ miles of road in all. This branch is the Contoocook River road, the Concord & Claremont Company having owned the line from Concord to Bradford, 27½ miles, and the Sugar River that from Bradford to Claremont Junction.

#### Burlington, Cedar Rapids & Minnesota.

Work is progressing on the extension of the Muscatine Division (formerly the Muscatine Western road) westward from the Iowa River. The masonry of the piers for the bridge over the Iowa River is going up, and the superstructure of the bridge is ready. The grading west of the river is being finished up. It is intended to complete the extension this season to a point near Richmond and 11 miles from the river.

#### Boston, Barre & Gardner.

The extension from Gardner, Mass., to Winchendon is nearly completed. It is expected that the tracklayers working from each end of the road will meet by November 1.

#### Maine Central.

The Maine courts have refused to grant the injunction which was asked for to restrain this company from building a bridge over the Kennebec River at College Narrows, near Waterville, Me.

#### St. Louis & Florissant.

Grading on this narrow-gauge road is progressing rapidly, and the whole line will shortly be ready for the ties.

#### Sioux City & Pembina.

The grading of this road is completed for 30 miles northward from Sioux City, Iowa.

#### Buffalo, Corry & Pittsburgh.

The final transfer of this road to the Allegheny Valley Company was made recently. The road is 43 miles long, from Corry, Pa., northward to Brookton, N. Y., on the Lake Shore & Michigan Southern. It is said that the Allegheny Valley Company intends to build an extension from a point near Brookton to Buffalo, a distance of about 50 miles.

#### Atlantic & Pacific.

A large number of suits have been commenced against this company for discrimination in freight charges, under the Missouri law. In a test suit which was brought to trial, October 13, the company filed a plea that it was organized and incorporated under a charter from the United States and was consequently not amenable to State law. A further plea was also made that by the original act incorporating the Pacific Railroad Company and its amendments, and by the act of 1863 to foreclose the State lien, the Legislature was prohibited from interfering with or regulating the company's freight charges.

#### Canada Southern.

All the preparations have been made for putting through passenger trains upon the route as soon as the International Bridge at Buffalo is completed. Through freight trains are now running, the cars going by way of Suspension Bridge. The line from Toledo to Detroit is nearly ready for the running of trains, which can be put on as soon as the main line is opened for through travel.

#### Southern Minnesota.

This road is being put in better order by the Receiver. The track is being ballasted, the depots painted and a number of small improvements made.

The preliminary surveys for the proposed branch from Blue Earth City to Mankato have been completed, and the work of locating the branch has been commenced.

#### Brunswick & Albany.

The sale of this road, which has been heretofore alluded to, took place at Brunswick, Ga., October 15. Several bidders were present, and the road was sold to Mr. J. N. Mayers, representative of German bondholders who own over \$2,000,000 of the first-mortgage bonds. The price paid was \$530,000, of which \$150,000 is payable at once and the remainder in six months. The telegraph line was sold to C. O. Whitney for \$2,900, subject to a five years' lease. Fifteen cars were sold separately, and purchased by O. O. Nelson for \$5,625. The road was not sold under foreclosure, but to satisfy judgments obtained by creditors.

A dispatch to the Albany (Ga.) News from Charles L. Schlatter announces that he, as representative of the bondholders, took possession of the road October 16, and would continue to run trains as usual. He says nothing can be done about extending the road west of Albany until a new company is organized.

The road is 171 miles long from Brunswick, Ga., west to Albany, and its business is very light.

#### Northern Pacific.

It is stated that the road is now provided with snow-fences and other necessary protection as far west as Jamestown, Dakota, 93 miles west of Fargo and 346 miles from Duluth. Should the winter prove light, trains will be run through to Bismarck, the terminus on the Missouri, but if there is any serious obstruction, trains will run only to Jamestown.

General Cass, President of the company, has appointed A. C. Sands, of Cincinnati, G. W. Steele, of Painesville, O., and Gen. W. G. Leduc, of Hastings, Minn., commissioners to examine the road and make a report on its condition.

#### Baltimore & Ohio.

Work on the new line to Chicago continues without interruption. The grading is progressing rapidly.

The company is building very extensive car shops at Newark, O., the junction of the Central Ohio, the Lake Erie and the Straitsville divisions. The shops, when completed, will employ some 1,200 men.

A few days since the company discharged 555 men from the Mount Clare shops in Baltimore. It is thought that this reduction of force will be only temporary.

#### Erie.

It is stated that a new dock is to be built south of the present passenger depot and ferry house in Jersey City, which will give the company a much needed addition to its yard room.

It is also stated that the foundry now in Jersey City will shortly be removed to Susquehanna. It is reported that this is a commencement of the removal of all the shops from Jersey City, which has been under discussion for some time.

#### New Jersey Southern.

The general offices of the company have been removed from New York to Long Branch, N. J. At the recent election, Mr. Jay Gould retired from the presidency and was succeeded by

Mr. Serat, late Superintendent. Reports have been current that the company is in embarrassed circumstances, and that a large part of its floating debt has become due or will shortly be payable. One or two suits have lately been commenced against the company.

It is also reported that the company will shortly pass under the control of the Baltimore & Ohio Company, which will use the road as its outlet to New York. As a line from Baltimore to New York it is not very indirect, but has the disadvantage of three long ferry transfers.

#### Wisconsin Midland.

Some time since the city of Whitewater, Wis., voted to issue \$50,000 in bonds in aid of this road. The road not having been built within the time agreed upon, the bonds were lately canceled and destroyed.

#### New Mail Routes.

Postal service, to commence November 1, has been ordered over the Northwestern North Carolina Railroad from Greensboro, N. C., to Salem, 29 miles.

An extension of mail service has been ordered over the new Theresa & Clayton Division of the Utica & Black River Railroad from Theresa Junction to Clayton, N. Y. The extension will commence November 1.

#### Northern Pacific-Pacific Division.

The work of completing the extension from Tenino to Tacoma by the contractors is going on, but all employees of the company except those necessary to operate the road have been discharged. The work of surveying and grading the town site at Tacoma has been suspended.

#### Olympia.

Thurston County, W. T., has voted to issue \$200,000 in bonds to the Olympia Mining & Railroad Company, which purposes building a railroad from Olympia southward to the Northern Pacific at Tenino.

#### Massachusetts Central.

Work has been resumed on the grading through the town of Sudbury, Mass. But little work has heretofore been done in that town.

#### Eastern.

Surveys are being made for a new track across Cambridge street and the Mill-pond territory in Boston.

The new Marblehead Branch from Swampscott, Mass., to Marblehead, is nearly completed and will probably be opened about November 1. The new branch is four miles long and makes the distance from Boston to Marblehead 16 miles. The present Marblehead Branch leaves the main line a short distance south of Salem.

#### Buffalo, New York & Philadelphia.

An excursion party composed of officers of the different roads, members of the press and others, recently passed over the new route from Philadelphia to Buffalo and Niagara Falls formed by this road, the Philadelphia & Erie and the Pennsylvania. The distance from Philadelphia to Buffalo by this line is 410 miles.

#### Lowell & Andover.

A number of proposals have been received for the construction of this new road, which is to extend from the Boston & Maine at Ballardvale, Mass., westward about nine miles to Lowell. The contract has not yet been awarded.

#### Selinsgrove & North Branch.

Efforts are being made to raise subscriptions for this road, which is to extend from Port Trevorton, Pa., northward to Selinsgrove, on the west bank of the Susquehanna, and thence southwest to Mifflintown, on the Pennsylvania road.

#### Paola, Garnett & Fall River.

Grading was commenced on this road at Paola, Kan., recently, and is to be finished to Garnett, about 30 miles, this season. The road is to be an extension of the Osage Division of the Missouri, Kansas & Texas, from Paola southwest, but is not built by that company.

#### Mississippi Valley & Western.

Officers of this company report that the company has succeeded in placing a large amount of its bonds, and that the iron for the extension from West Quincy, Mo., to St. Louis is to be purchased at once. The work of tracklaying is to be commenced at several different points and pushed forward rapidly.

#### Burlington, Cedar Rapids & Minnesota.

It is stated that arrangements are being made by which all the trains on this road will arrive at and leave from the Union depot at Burlington, Ia. The necessary changes in the side tracks and connections are being made and will be completed about November 1.

#### Delaware, Lackawanna & Western—Morris & Essex Division.

Work on the new tunnel through Bergen Hill has been resumed and is going forward as rapidly as possible. Much trouble has been experienced from water in the shafts, and the contractor is putting up steam pumps at several of the shafts.

#### Savannah & Memphis.

The Columbus (Ga.) Sun says: "Colonel W. L. Salisbury, a director of the Savannah & Memphis Railroad, and a member of the Executive Committee, tells us that all the resident engineers—those who estimate work—have been or will be discharged. The locating engineers will be kept in the field. The bridge over the Tallapoosa is to be finished as soon as possible. Only one pier remains to be completed. It is expected trains will soon cross the structure by the middle of next month. There is already on hand sufficient iron to lay the track beyond the river, and then work will be probably suspended until times become easier and the financial agents have recovered from their temporary suspension."

#### Portland & Ogdensburg—Vermont Division.

Vermont papers state that it has been decided to lay no more iron at present on the western end of the road. It is reported, however, that the town of Johnson, which has not yet issued its bonds to the company, will issue them at once, in which case the iron will be laid to Johnson, some five miles beyond Hyde Park.

#### South Mountain & Boston.

This company has called in a second installment of 10 per cent. on subscriptions to the stock. This installment is payable on or before November 1.

#### Great Southern.

The directors of this company, which intends to build a railroad from Jacksonville, Fla., northward to a connection with the Atlantic & Gulf road, are reported to have resolved to issue first-mortgage bonds to the amount of \$9,000,000, which would be at the rate of nearly \$100,000 per mile. The company has no road built as yet.

#### Peoria & Rock Island.

Suits have been pending for some time against a number of subscribers to the stock, residing in Davenport, Ia. When these subscriptions were made, 5 per cent. was paid down, and the rest was to be paid in installments as the directors might call for it. A final call was made for the other 95 per cent., which the subscribers declined to pay. In a test case recently,

the company urged that calls had been made previous to the last, but the district court held that these calls were invalid and made without authority, the whole subscription to the capital stock not having been made. The court also decided that, as the terms of subscription to the capital stock called for payment in installments, the company could not ignore the agreement, and make one call for 95 per cent., notwithstanding it appeared that the road had been fully completed.

Exceptions were taken to the decision, and an appeal will probably be made. This test case will govern all the others, which involve nearly \$100,000.

#### Chicago & Atlantic.

A meeting of the Executive Committee was held in Pittsburgh, October 6. After receiving the report of the Treasurer of the company and the President of the construction company it was resolved to continue the work and have the first 25 miles ready for the iron by November 1.

#### Flint & Pere Marquette.

All new work in the car shops at East Saginaw, Mich., has been suspended, and nothing but repair work will be done in the shops for the present. About 140 men have been discharged from the shops.

#### Chicago & Atlantic.

Wells County, Ind., has voted \$55,000 in aid of the road. Elections will shortly be held in a number of other counties and towns along the line on the question of voting aid.

#### Atlantic & Great Western.

A newspaper report says: "It is said that the real object of Gen. McClellan in visiting Europe is to make some arrangement in regard to the payment of about \$500,000, which it is rumored is due from the Atlantic & Great Western Railroad to the United States Rolling Stock Company for the use of its locomotives and cars. The Rolling Stock Company is anxious to get the money due to it, particularly as railroad traffic in all parts of the country is in a depressed condition."

It is hardly true to say that "railroad traffic in all parts of the country is in a depressed condition;" for so far as we have reports the contrary is the case, the traffic being larger and more productive than usual. It is true, however, that the railroad companies generally have reduced expenditures for objects not immediately necessary, such as new rolling stock and track construction, even when it is known that such increase of facilities will be wanted as soon as it can be made.

#### Chesapeake & Ohio Canal.

Since January 1, this company has appropriated \$152,935 to pay over-due coupons and \$2,712.88 to pay principal and interest of two outstanding repair bonds. The balance in the treasury September 30 was \$73,429.94 and the uncollected revenue \$27,769.96. This will enable the directors to appropriate \$50,985 required to pay off the coupon due July, 1858, on the preferred construction bonds. Notwithstanding the loss of nearly a month's revenues from damage done by floods in July and August, receipts have been only \$10,000 less than last year.

#### Missouri, Kansas & Texas.

This company has notified the New York Stock Exchange that in accordance with the resolution passed by the stockholders at the recent annual meeting, the capital stock has been increased \$4,460,000 on account of 142 miles of newly acquired road from Sedalia, Mo., to Hannibal. Of this 72 miles from Sedalia to Moberly was built by the company, and the remaining 70 miles, from Moberly to Hannibal, purchased. The amount of the capital stock now, on 785 miles of road, is \$21,405,000, or \$27,268 per mile, and the bonded debt is \$17,900,000, or \$22,802 per mile, making a total capital account of \$39,305,000, or \$50,070 per mile.

#### Railroads in Mexico.

Commenting on some remarks which we made a few months ago on the infrequency of trains and numerous long stops on the Vera Cruz & Mexico lines, the *Two Republics*, of the city of Mexico, says:

"Our American colleague has not heard of the latest efforts toward railway progress in this country. The enterprising people of Huamantla, a town on the line of this road, have been preparing a petition to the government, to order that the trains up and down on the line stop there over night that the passengers may not be over-fatigued on their long journey. Another proposition, in the same spirit of progress, is also mooted; it is to take the locomotives off the Tlalpam road, on account of their unsafety, and that mules be substituted; the fare then to be doubled, and the running time quadrupled. The effect, if not the object, will be to drive off all the market people. This proposition is now known as the 'Jackass Propelling Express' scheme."

In his address at the opening of Congress, September 16, President Lerdo said:

"It is unnecessary to recommend the railroad projects pending solution. Their utility is great, and so well known is also the desire of the Mexican people for the realization of those enterprises, which should produce the most abundant fruits of prosperity. With the projected railroads our agriculture in the interior would be fomented, and later, the great advantages of placing the republic in immediate communication with the United States and Europe would be obtained, Mexico also having a way of communication with Asia. Among the pending projects, that referring to the reduction of the tariffs of the railroad from Mexico to Vera Cruz and the speedy termination of the Jalapa Railroad is equally worthy of consideration. Both improvements would give a new movement to wealth in very rich districts, and would develop on a large scale the exportation of our tropical fruits."

#### Costa Rica.

The following statements are from a report dated June 1, 1872, and made by Senor Nanne, Director-General of the Costa Rica Railroad:

"The Costa Rica Railroad was actually commenced on the 8th of October, 1871, at Alajuela, and the first 'Branch' was built at Limon, on the 15th of November, 1871. The latter place was a perfect wilderness, and destitute of resources of any kind. On the 6th of February, 1872, the first locomotive arrived at Alajuela and the first spike nail was driven on the 2d of March, 1872. The first shriek of the steam whistle was heard on the 5th of March, 1872, and the first excursion train of about 9,000 spectators left the Ciruelas bridge on the 31st of March, 1872. On the 6th of August the first excursion train was dispatched to Heredia, seven miles distant, and on the 30th of December to San Jose, 13 miles. Another 134 miles to Cartago are expected to be opened next month (July). These 264 miles constitute the fourth division, which is therefore fast drawing to a completion."

"The next division from Cartago to Angostura, 26 miles, is well under way. This is the most difficult division of the whole line. There are over 1,000 men at work upon it, and the works have made most progress 15 miles east of Cartago. So much for what we may call the Pacific Division. On the Atlantic Division we may state that the first spike was driven in May; at the commencement the works, owing to several unforeseen difficulties, were considerably delayed. The first locomotive started on the line in July, 1872. Up to the present date, there are about 14 or 15 miles of track laid, and the works are now going ahead in first-rate style. The principal difficulty (the clearing) is really all accomplished, to the extent of 85 miles, up to Pacuare. The extent of ground to be moved on



the first division—35 miles—is about 500,000 cubic yards, with about 15,000 cubic yards of masonry. The second division—28 miles—from Pamare to Angostura, is already surveyed and laid out, but no works will be commenced upon it until the locomotive can run to Pacuare. The second division is in tolerable good ground, and will be the last to be finished, in accordance with the terms of the contract. The stations at Alajuela, Heredia, San Jose and Cartago are pretty well finished up to contract."

#### The Gauge of Canadian Railways.

The Toronto (Canada) *Monetary Times* of October 10 says: "If any doubt remained after the legislation of last session, in reference to the Intercolonial Railway, this action of the Grand Trunk Company must be held to completely settle the much debated question: What shall be the standard gauge of Canadian railways? The history of this gauge question affords a singular example of eccentricity on the part of so staid and self-possessed a body of wise men as the Parliament of Canada. By a vote of nine to two the Railway Committee of the House of Assembly on the 31st July, 1851, decided that the Provincial gauge of 5 ft. 6 in. should be adopted; and the companies receiving Government assistance were practically compelled to build on this gauge, although contrary to the judgment of many of the best engineers whose evidence was placed before the committee. The Great Western Railway commenced the work of undoing the mistake of that committee; the Dominion Government followed suit, and now the Grand Trunk is paying its share of the price due to the folly of settling a great practical question by a committee of lawyers and politicians. The Northern Railway will change probably next year; the Midland are making preparations to do so immediately, and all the other lines which are of the broad gauge must follow suit."

#### Hudson & Jackson.

At a meeting of the stockholders of this company in Hudson, Mich., October 1, it was voted unanimously to dissolve the organization. The Secretary and Treasurer were instructed to settle all debts of the company and to divide any funds remaining among the stockholders. The company, we believe, has never succeeded in doing any work on its projected line.

#### South Carolina.

A 29-ton locomotive, with 18 by 24 inch cylinders, was recently turned out of this company's Charleston shops, and made a successful trial trip from Charleston to Augusta and return. Another locomotive of the same size and weight is nearly completed.

#### Western Maryland.

The trains on this road have begun to run regularly over the new track from Owings Mills to Baltimore. The new arrangement commenced October 15. Trains leave the Union depot on Charles street and run through the Baltimore & Potomac tunnel.

A freight warehouse has been put up at Fulton street at the western end of the Baltimore & Potomac tunnel, besides a passenger house. An engine house is now being built at the same place.

At the annual meeting in Baltimore, October 15, the usual reports were presented and, in view of the near approach of the time when the road will be completed to Williamsport, the meeting adjourned subject to the call of the President. At the adjourned meeting full reports as to the construction and working of the road and the financial condition of the company will be presented.

#### Des Moines Valley.

The sale of this road under orders of the United States Circuit Court took place at Des Moines, Ia., October 17. The road was sold in two sections, the first from Keokuk to Des Moines, 161 miles, and the second from Des Moines to Fort Dodge, 88 miles, including the bridge over the Des Moines River. The rolling stock was distributed between the two sections in proportion to their length. The section from Keokuk to Des Moines was purchased by J. A. Johnson, on behalf of the first-mortgage bondholders, for \$1,175,000, and the line from Des Moines to Fort Dodge by C. H. Perry, of Keokuk, representing the Keokuk & Northwestern Railway Company for \$475,000, making a total of \$1,650,000. The Court decided some time since that the first-mortgage bonds were a first mortgage on the line from Keokuk to Des Moines only, the second-mortgage bonds being a prior lien on the road from Des Moines to Fort Dodge.

#### West Wisconsin.

This company has put on the road 250 Blue Line cars, to run between Boston and Minneapolis and St. Paul, by way of Chicago.

#### Railway Postal Service.

A Washington dispatch says that the tables prepared for the Postmaster-General's report show that by the recent readjustment of pay on railroad routes for the year ending September 30, 1878, the aggregate amount of annual compensation to railroad companies has been increased \$223,823, and is now \$1,015,508 per annum. The readjustment has been made on 57 routes. Six hundred railroad companies receive pay for carrying the mails, and the aggregate length of the railroad service in the United States is nearly 65,000 miles.

#### Covington & Lexington.

A Frankfort (Ky.) dispatch of October 17 says: "Mr. M. C. Johnson and Isaac Caldwell, his associate counsel, accompanied by Mr. Pendleton, without having given notice to the counsel for appellant, made application to the Court of Appeals for leave in the Covington & Lexington Railway case to file suggestions to the Court on their behalf, in reply to the petition for modification of the mandate and the response of appellants. There was no party in the court to represent the appellant except Mr. Zinn, who stated that his presence in the court was accidental, and that the application was a complete surprise to the appellant's counsel, who objected to the delay. If granted, however, he asked that the road should be put into the hands of a receiver. The Court stated that they had no power to do so, and granted thirty days to the appellees within which to file their suggestions. This will carry the case over to the winter term."

Meantime the road remains in possession of the Kentucky Central Company.

#### St. Joseph & Denver City.

The annual meeting of this company was held in Elwood, Kan., (opposite St. Joseph, Mo.) October 14. The city of St. Joseph, which owns \$500,000 stock of the company, was represented by Mr. John Severance, Mayor of the city. After the meeting had been called to order, a committee on credentials was appointed, the committee consisting of John Severance, John Doniphan and Wm. Pratch. The Secretary of the meeting, E. H. Saville, then presented to the committee a list of the stockholders as appeared on the books of said company on September 10, 1878, with the amounts owned by each. The list showed about \$4,000,000 of stock issued. John Doniphan and Wm. Pratch made a majority report that there was about \$3,400,000 of stock in the company represented in the meeting and entitled to vote. John Severance made a minority report which was that there was about \$500,000 of bona fide stock represented, which alone was entitled to vote; that the other pretended stock was issued without consideration, if it was issued at all; that such fictitious stock should not be allowed to vote, and he, on behalf of the city of St. Joseph, who was the largest stockholder, and owned a majority of the stock properly and

legally issued, protested against the voting of any other stock represented in said meeting, except the stock of the city of St. Joseph, Missouri, and the county of Brown, Kansas. The minority report was rejected, the majority report was accepted. The board of directors elected includes nearly all of those who came into the board a short time since.

Upon a motion to ratify the act of the board of directors, making a second mortgage on the Eastern Division of the road, the resolution was carried. John Severance, on behalf of the city of St. Joseph, voted no.

#### Washington & Ohio.

A contract for the grading of the extension of this road from its present terminus at Hamilton, Va., to Winchester, has been let to Hammer, Adams & Co., of Lynchburg, Va. Work is to be commenced January 1, 1879. The distance from Hamilton to Winchester is about 30 miles.

#### Maryland Central.

The ordinance giving the indorsement of the city of Baltimore to \$600,000 of the bonds of this company came up in the second branch of the City Council, October 17. It was laid on the table, which disposes of the question for the present and until a new council comes into office.

#### Petersburg.

Messrs. Reuben Ragland, S. A. Plummer and W. R. Mallory advertise that they will sell at auction, in New York, October 29, 10,000 shares of the stock of this company, to close a partnership. The terms include \$250,000 cash and \$250,000 due August 1, 1879, with interest at 6 per cent. Mr. Ragland is President of the company. The whole amount of the capital stock is \$1,324,200. The road runs from Petersburg, Va., to Weldon, N. C.

#### Portage Lake Ship Canal.

The canal is now open and vessels are passing through. The canal from Lake Superior to Portage Lake is 2 1/2 miles long and has a depth of 14 feet of water. At the Lake Superior end, two piers, each 1,000 feet long, extend into the lake, forming a harbor. The opening of the canal enables vessels from the upper end of the lake to avoid the long passage around Keeweenaw Point, and also to pass by the important copper-mining town of Houghton.

#### Western Illinois Bridge.

The two companies organized under this name, one in Illinois and one in Missouri, have been consolidated, the name remaining unchanged. The bridge across the Mississippi at Quincy, Ill., which the company intends to build, is to be a railroad and wagon bridge and is to be open to all railroad companies desiring to use it. The surveys have been completed and the plans prepared. These plans provide for a bridge from the foot of Delaware street, Quincy, to the northern end of Goose Island, the bridge having eleven piers and two abutments, the draw being placed close to the Illinois shore. From Goose Island to the Missouri shore trestle work will be used.

#### St. Louis, Kansas City & Northern.

The new shops at Moberly, Mo., the junction of the Kansas City and Ottumwa lines of the company, are now nearly completed. The ground on which the shops are built comprises about 200 acres and is nearly in the form of an equilateral triangle, two sides of which are formed by the two lines of road. The buildings comprise a round house 390 feet in diameter and holding 60 engines; a foundry, 60 by 200 feet; a blacksmith shop, 110 by 152 feet; a machine shop, 121 by 219 feet; a wood machine shop, 75 by 200 feet; a car shop, 85 by 200 feet; a paint shop, 81 by 241 feet; a tin shop, 30 by 70 feet; a carpenter shop, 30 by 60 feet; a dry house, 20 by 40 feet; a lumber shed, 40 by 144 feet; and a main office building, 60 by 100 feet. There are also an oil house, pattern house, brass foundry, iron shed and gas works. The buildings are all heated by steam and lighted by gas. Three freight cars per day can be turned out of the car shops, besides all the passenger coaches needed, and there is room enough to build all the locomotives for the use of the road, besides making repairs. About five acres will be roofed over.

#### Shenandoah Valley.

Work on this road has been suspended for the present. Officers of the Central Improvement Company, which is building the road, state that the suspension is only temporary, and that there is no doubt that the road will be completed within the time named in the contract. The road is to run from a connection with the Martinsburg & Potomac up the Shenandoah Valley to some point on the Chesapeake & Ohio and will be nearly parallel to the Valley road, which is now being built in the interest of the Baltimore & Ohio.

#### Maine Central.

At the special stockholders' meeting held October 8, it was voted to accept the agreement of consolidation with the Portland & Kennebec, Somerset & Kennebec and Leeds & Farmington companies.

#### Portland & Kennebec.

A special meeting of the stockholders was held October 8 to vote on the agreement of consolidation with the Maine Central Company. The meeting adjourned for four weeks without taking any action. The adjournment was had to give time to attend to some legal technicalities.

#### International & Great Northern.

The capital stock of this consolidated company is fixed at \$25,000,000. Of this amount \$5,000,000 is to be issued at once in shares of \$100, the stockholders of the International receiving 23,330 shares, and those of the Houston & Great Northern 26,670 shares. By the last published report (December 31, 1877), the International Company had outstanding first mortgage bonds to the amount of \$2,880,000; the company has also a claim on the State of Texas for a subsidy of \$10,000 per mile in bonds. The Houston & Great Northern Company had outstanding at the same time first-mortgage bonds to the amount of \$3,100,000, and convertible bonds to the amount of \$1,200,000. The company also has a land grant of 16 sections per mile from the State of Texas.

The completed road forms a line from Houston, Texas, northward to Palestine and thence northeast to Longview, on the Texas & Pacific, 235 miles; a line from Troupe, 38 miles southwest of Longview, northward 44 miles to Mineola on the Texas & Pacific; a line from Palestine southwest to the Brazos River, 97 miles; and a branch from Phelps, 66 miles north of Houston, to Huntsville, 8 miles; a total of 384 miles of road. An extension of 25 miles from the Brazos River southwest is under construction. The amount of stock per mile of road now completed is \$13,020 per mile.

The agreement of consolidation was made some time since, and the roads have since been operated under one management. The consolidation could not be completed without some legislation, which was obtained last spring.

#### Gilman, Clinton & Springfield.

In the suit before the courts at Bloomington, Ill., last week, the answer of the directors to the complaint in the suit is a general denial of the charges made. Concerning the Morgan Improvement Company, the answer says that the directors were compelled by public opinion to accept any offer they could get for the construction of the road. The Morgan Improvement Company, to which the contract was awarded, was a responsible company, and able to secure the necessary funds. The profits on the contracts were not excessive or fraudulent.

It is admitted that the Morgan Company received \$6,000 per mile in township and county bonds, beside \$2,000,000 (\$18,000 per mile), in first-mortgage bonds of the company, but these bonds were sold at prices ranging from 60 to 93 cents on the dollar, and all the township bonds have not been issued, \$60,000 being in litigation. Stock to the amount of \$1,400,000 was also issued to the Morgan Improvement Company, but this stock had no market value and was only issued to enable the Morgan Company to protect itself in the stockholders' meetings.

#### New York & New England.

The bridge leading to the station at the foot of Summer street, Boston, has been thoroughly repaired. It has been also widened to the utmost limits allowed by the harbor commissioners, in order to allow new side tracks to be laid. A considerable length of new side track is being laid near the freight-house, for the use of the milk trains and express cars as well as for freight. The freight-house itself is being improved.

#### Utah Northern.

The track is laid to Hyde Park, Utah, four miles north of Logan and 45 miles from Brigham, the present southern terminus. The grading is completed some distance beyond Hyde Park, and there is iron enough on hand to extend the road to Smithfield, four miles farther. Work is progressing rapidly on the southern extension from Brigham to Ogden, which will be some 25 miles long.

#### Columbus & Toledo.

At a meeting held in Columbus, O., recently, the board of directors resolved to locate the road through Delaware, Marion, Upper Sandusky, Carey and Fostoria. It was also resolved to suspend all work until the subscriptions to the stock reached \$1,000,000. An installment of \$5 per share on all subscriptions was called in.

#### Milwaukee, Lake Shore & Western.

The general offices of this company were removed from Milwaukee to Manitowish, Wis., October 1.

#### Wisconsin Central.

Trains are now running to Chelsea, Wis., 14 1/2 miles from Menasha, and 7 1/2 miles beyond Stevens Point. The stations north of Stevens Point (63 miles from Menasha, the southeastern terminus of the road) with the distances from Menasha are: Mill Creek, 78.7 miles; Auburndale, 86.8; Marshfield, 94.9; Waltham, 102.9; Unity, 109; Colby, 114.2; Dorchester, 122.5; Medford, 130.5; Charlestown, 135.5; Chelsea, 141.7.

#### Mercer & Somerset.

The track is laid to Harlingen, N. J., and a little beyond that place. Harlingen is 16 1/2 miles from Somerset Junction, the junction of the Mercer & Somerset with the Belvidere Delaware road, and seven miles beyond Hopewell, the late terminus.

#### Illinois & St. Louis Bridge.

The Commission of United States Engineers appointed to examine this bridge and ascertain whether it will, when completed, be an obstruction to navigation, has made an elaborate report. The conclusion arrived at is that the bridge will prove a serious obstruction to the navigation of the river. As it is now impracticable to change the plan of the bridge, or to raise it, except at enormous expense, the commission recommends that a canal, or open cut, be made behind the eastern abutment, this canal to be 125 feet wide, extending from a point 500 feet above the bridge to 300 feet below it. The canal to be crossed by a draw having a clear opening the whole width of the canal. It is also recommended that arch trusses, like those of this bridge, be in future prohibited for bridges over navigable streams.

#### Southern Maryland.

The grading of this road from Point Lookout to the crossing of the Pope's Creek line of the Baltimore & Potomac is completed with the exception of about 22 miles. The uncompleted portion is under contract.

#### Lewiston & Shore Line.

A road is talked of, to extend from the Grand Trunk at Lewiston, Me., northeast through Gardiner and Belfast to a connection with the projected Bangor & Calais Shore Line. It is said that the Grand Trunk Company will give substantial aid to such a road.

#### Kent County.

Grading on the extension of this road, which forms the western section of the New Jersey Southern's line across Delaware, is progressing rapidly. This extension leaves the road at Worton station, four miles above Chestertown, and runs thence westward to Herring Ponds, on Chesapeake Bay. The distance from Worton to Herring Ponds is 9 1/2 miles, the grading of which is nearly finished. A steam dredging machine and a pile-driver are at work on the channel and docks at Herring Ponds. The route formerly adopted for the extension of the bay, that from Chestertown to Deep Landing, has been abandoned. The rails were laid on five miles of this extension, from Chestertown to Parsons, but they are now being taken up and used for sidings on the Smyrna & Delaware Bay road, the eastern end of the line. The four miles from Worton to Chestertown will be retained and worked as a branch line.

#### Potrero & Bay View.

Robert Shea brought suit against this company, in the Fourth District Court of San Francisco, to recover \$25,000 for personal injuries received. The jury returned a sealed verdict in favor of the plaintiff, assessing the damages "at the sum of \$7,000 in gold coin of the United States." Counsel objected to the verdict, on the ground that the damages could not be assessed in coin. The jury again retired, and in a few minutes returned the verdict amended by having the phrase, "in gold coin of the United States," omitted.

#### New Orleans & Texas Western Central.

A charter for a company by this name has been published in New Orleans, and efforts are being made to organize a company to build the road and furnish New Orleans with the long-desired railroad connection with Texas.

#### Texas & Pacific.

Regular trains are running on the Transcontinental Division from Sherman, Texas, east to Quincy, 33 miles. The work of tracklaying is progressing steadily, and the road is expected to be open to Honey Grove, 43 miles from Sherman, by November 1.

#### Wisconsin Valley.

A large force is at work on the grading from the present terminus at Centralia, Wis., northward to Knowlton. Tracklaying has been commenced at Centralia, and it is expected that trains will run to Knowlton early in November. Work will be continued as late in the season as possible, and it is hoped that the road will be opened to Wausau early next spring.

#### Keokuk & Kansas City.

The Kansas City (Mo.) *Journal* says that the grading is completed from Macon, Mo., to Edina, 38 miles, and iron is being laid; grading is going on from Keokuk, Ia., to Edina, 43 miles, and also between Cambridge and Marshall, in Saline County, Mo. Iron is being laid between Salisbury and Glasgow, 17 miles, and work will soon be commenced between Macon and Salisbury. The road is being located from Marshall to Kansas City.